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History of Pharmacy as an Academic Discipline

GEORGE URDANG*

A NEW ERA within the teaching of the history of pharmacy is to be inaugurated by this lecture. An era in which the history of the scientific and professional activities that we think belong to the sphere of what we call pharmacy will be taught and studied not as a sideline any more, but in an analogous way and under the same conditions as the other branches of the history of the sciences and professions and even, for the time being, in advance of some of them.

Pharmacy has had to go a long way to achieve this goal and it is primarily this way, the history of the history of pharmacy so to say, to which this introductory lecture will be devoted.

There is one question which has to be answered in the very beginning. Have the concepts "pharmacy" and "history" been definitely fixed at a more or less early time or have they too, like the subjects they have been dealing with, paid their tribute to the changes within a continuously changing world? As was to be expected they have done the latter. They have undergone changes in the course of time.

There was a time when the pharmaceutical activities, the sum total of which we call pharmacy, were an integral part, and a very important one, of the art of the physician. It was followed by a time when these activities, expanded as they were by the continuous additions to the *materia medica* and more complicated methods of preparation and drug storage, had become the task or at least responsibility of a new group of experts, the professional pharmacists. It is understood that, at this time, the term "pharmacy" was used mainly as a designation of the work done and the part played by these people who were supposed to cover the whole field, the pharmaceutical retail business as well as the manufacturing of complex drugs.

At the height of this period the young science of chemistry found its promotion, its places of work, and the men to do the work in the labora-

* Professor of the History of Pharmacy. Introductory lecture to the first course in pharmaceutical history for the senior class of the School of Pharmacy of the University of Wisconsin (September 29, 1947).

tories of these pharmacists to such an extent that the great historian of chemistry, Hermann Kopp, did not hesitate to call pharmacy the mother of scientific chemistry. This flattering statement, made just a century ago, has given rise to the notion that in those days pharmacy and chemistry were so closely connected that their history during this period is almost identical. Although this idea of identity goes too far, there cannot be any doubt that a presentation of the History of Chemistry which should attempt to bypass or minimize the part of pharmacy in the development of chemistry would be quite as incomplete as would a History of Pharmacy similarly minimizing chemistry and its meaning to pharmacy.

With the rapid growth of chemistry in all its branches and ramifications, creating as well as subjected to a definite change in economic world conditions based on and requiring mass production, pharmacy experienced a division of labor changing its entire structure. The various tasks to be performed by pharmacy have been gradually taken over by special groups of people. Still retail pharmacy with its twin sister, hospital pharmacy, represents the hub of the wheel, offering the place at or from which the individual customer is furnished with the drugs needed. The manufacturing part, however, has become the task of a special industry growing steadily in importance and assigning to retail pharmacy a new responsibility, that of adviser to the medical practitioner as well as to the public with regard to the nature of modern remedies. There has developed furthermore an organized wholesale trade in drugs and accessories conducted by or using the services of pharmacists. Hence it is not retail pharmacy and its activities alone any more, but the sum total, the coordinated endeavor of all the groups participating in the tasks belonging to or connected with the meeting of the medicinal needs of the people everywhere, which is now designated by the term "pharmacy," and which must be made subject to the history of pharmacy.

And what about the concept of "history"? There was a time when history was regarded as a narrative or a chronological account of data and dates centering around the fate of dynasties, of individual kings and heroes and the endless chain of wars. Gradually the point of view has changed. The general interest has shifted from royalty to the plebs, to the common people and their fate, and from the mere recording of facts to attempts at their adequate interpretation. We want to know not only the what but, as far as possible, the why also. The fact-finding has to be followed by an attempt at sense-finding.

As for pharmacy, we do not think it sufficient any more to know a number of details about the profession, its tasks, its work, and fate throughout the ages. We have become aware of the fact that nothing is isolated in this world of ours, that whatever has happened, and is going to happen, in or to pharmacy reflects the general situation of the time concerned, and we wish to know about this interrelationship in order to understand both the development of the general situation and that of pharmacy.

It has been said before that pharmacy, although it has never been identical with chemistry, has always been closely connected with this most important of its basic sciences. This connection has been based on the substantial similarity of the work done in the pharmaceutical as well as in the chemical laboratory. And as was pointed out before, there has existed since time immemorial a still closer connection between pharmacy and medicine. This connection, however, and this is a very important fact, has been one of a common purpose, that of preventing and curing disease, rather than a relationship based on any substantial analogy to the work expected of the two professions for the sake of society.

Whenever a wrong interpretation of this common purpose or other circumstances have led to the concept of such a work analogy and its realization on the one side or the other, to counter prescribing by the pharmacist and/or to dispensing by the physician, it has meant a transgression and an interference which, although they might sometimes have been required by temporary necessities, have never had any real justification. It is understood that the development of the relations between medicine and pharmacy must be dealt with by the pharmaceutical historian; and in the history of drug therapy the historians of both professions have a broad field in common in which they very fortunately supplement each other.

Pharmacy and medicine, by the very nature of their tasks, have placed upon their adepts a special social responsibility, and society has, through the ages, rewarded them with a rather privileged position within the community. The members of both professions have always been typical representatives of the educated middle classes of their time, bearers and promoters of cultural standards and tendencies, and have been so held. That condition has found its expression in literature and art as well as in the part played by the members of both professions in society at large, and these relations of pharmacy not only to science but to gen-

eral culture are naturally subjects to be dealt with by the historian of pharmacy.

The field is very wide, indeed, and there is still much to be done before even a modest degree of completeness or perfection can be claimed. On the other hand, pharmacy can justly be proud of the work of love done through the ages by members of the profession, and partly by others, in the field of its history.

Since the beginning of the eighteenth century more or less elaborate sketches on the historical development of pharmacy were published in, or as introductions to, dispensatories and textbooks. To Spain goes the credit for having published the first fairly comprehensive general treatises devoted to the History of Pharmacy. However, the *Histoire des apothicaires chez les principaux peuples du monde,* by the French physician, A. Philippe, world-wide in scope as it was, may be regarded as the cornerstone of the edifice called History of Pharmacy. It was published in 1853. Of equal if not even greater importance was the *Geschichte der Pharmazie* by the German pharmacist Hermann Schelenz published in 1905 and likewise world-wide in scope. On the history of drugs enormous material has been presented by Flückiger and Hanbury, by Alexander Tschirch, and, in this country, by John Uri Lloyd.

Since the publication of the book of Schelenz, treatises on the History of Pharmacy have appeared in almost all countries of the civilized world. Only a few of those written in English since the beginning of this century may be mentioned: A. C. Wootton, *Chronicles of Pharmacy* (London 1910), Ch. H. LaWall, *Four Thousand Years of Pharmacy* (Philadelphia 1927), C. J. S. Thompson, *The Mystery and Art of the Apothecary* (Philadelphia 1940), E. Kremers and G. Urdang, *History of Pharmacy* (Philadelphia 1940), G. Urdang, *Pharmacy's Part in Society* (Madison, Wis. 1946). The number of articles of pharmaceutico-historical interest, published in periodicals and partly given more ample distribution and greater permanence by reprints, can hardly be counted.

In spite of all this endeavor, it took quite a while before the history of pharmacy found official recognition even within the profession. It was in this country that for the first time a national pharmaceutical body, the American Pharmaceutical Association, made the History of Pharmacy a part of its responsibility. The former Director of the School of Pharmacy of the University of Wisconsin, Dr. Edward Kremers, inaugurated this remarkable event. On his instigation the American Pharmaceutical Asso-

ciation created in 1902 a "Committee on the History of Pharmacy" which in 1904 was made a "Section on Historical Pharmacy," and of which the initiator was the chairman until, in 1913, he refused to accept re-election. Of course Kremers' historical inclination also found its expression in the School of which he was Director.

At about the same time that the American Pharmaceutical Association Committee on the History of Pharmacy was established, Kremers started in his home a kind of seminar on the history of pharmacy as well as of chemistry. In the catalogue for 1907-08 of the University of Wisconsin, History of Pharmacy as well as History of Chemistry appear for the first time officially as recognized subjects of instruction, both announced by the same teacher, Edward Kremers. While he surrendered in 1920 the course in the History of Chemistry to Dr. Kahlenberg, then Chairman of the Chemistry Department, he continued teaching History of Pharmacy until, some time after his retirement, the course was taken over by Dr. Richtmann.

It is noticeable that in all these years, from 1907 until the present, there has never been an interruption in the teaching of pharmaceutico-historical subjects at the School of Pharmacy of the University of Wisconsin. There certainly are only a very few, if any, pharmaceutical institutions of learning in this country which can equal this record.

And yet, Dr. Kremers knew quite well that the subject could be done full justice only if someone was enabled to devote his whole time and work exclusively to the history of pharmacy. This was certainly in his mind when, in 1939, he had me come to Madison and tried whatever he could to keep me here after my original job, the writing of the Kremers-Urdang *History of Pharmacy,* had been completed. Thus he heartily welcomed it when, early in 1941, about half a year before he died, his successor, the present Director of the School of Pharmacy of the University of Wisconsin, Dr. Arthur H. Uhl, initiated the founding of the American Institute of the History of Pharmacy with me as Director. It may well be said that this Institute has developed to what it was intended to be: a center for pharmaceutico-historical research and information.

In the years since the founding of the Institute the consciousness of history in this country has grown by leaps and bounds. Going through, actively and passively, one of the most decisive periods of world history, everybody is pondering why all this had to happen. The fact has become obvious that there is quite an incongruity between our civilization and

our culture, the enormous advances of science and their use for the elevation of our standards of life on the one side and our incapacity for coping with these advances for the sake of a standing order of life on the other. The idea has taken root that a better understanding of the development and achievements of the sciences and professions might be of some help in acquiring a greater human certainty, firmness, and determination. For this reason the study of the history of science, and of the professions whose tasks are based on the application of science, has been given in the past years more attention than ever before.

The University of Wisconsin had established a chair for the history of science in 1942, one year after the founding of the American Institute of the History of Pharmacy. Its occupant, Professor Guerlac, left the campus after only two years in order to do war work. He was replaced in the fall of 1946 by Professor Stauffer, who was joined one year later by Professor Clagett. In January of 1947 Professor Ackerknecht started a course in the History of Medicine in the School of Medicine of the University of Wisconsin. With pharmacy added to this team in the fall of 1947, and considering the fact that Professor Ihde already some time ago has started a course in the History of Chemistry which will in all probability likewise become one of the regular teaching subjects on this campus, the University of Wisconsin is offering to its students a unique help in the urgent task of bridging the above-mentioned gap between civilization and culture.

Reporting on the work of the American Institute of the History of Pharmacy, I have for years concluded with a remark which is equally valid for this academic course. It reads as follows:

"The aim is to equip the pharmacist for citizenship in the world of intellectual and moral responsibility by making him familiar with the non-technical aspects and humanistic ramifications of his profession, and to do pharmacy's share in the cooperative endeavor for making the historical record of world civilization and culture as complete as possible."

Biography of Dr. Johann Peter Frank

Imperial and Royal Court Councillor, Hospital Director and Professor of Practical Medicine at the University in Vienna, Member of various learned Societies.

*WRITTEN BY HIMSELF**

Translated from the German, with an Introduction and notes, by

GEORGE ROSEN

Introduction

1745—A critical year in the annals of England! Hard on the heels of the defeat inflicted by Maurice de Saxe upon the combined English and Dutch forces at Fontenoy followed the Jacobite rebellion led by Bonnie Prince Charlie. 1745—A victorious year for Prussia! At Hohenfriedberg and Kesseldorf, Friedrich II of Prussia defeated the Austrians and brought to a victorious conclusion the Second Silesian War. And it was also in 1745, a year replete with the alarums and excursions of war that Johann Peter Frank was born. For the most part, however, his life was not affected by the storms of war, and throughout his entire career he was concerned only with works of peace and the welfare of his fellowmen.

Johann Peter Frank is best known at present as a pioneer in public health and social medicine, and he fully merits this description. Among his contemporaries, however, Frank's reputation was based largely on his activities as clinician, medical educator, and hospital administrator, and this reputation was, indeed, well deserved. For example, he opposed the separation of medicine and surgery, insisted on the need for bringing the medical student to the bedside, and emphasized the importance of establishing as early as possible within the student's mind the relations between preclinical and clinical subjects.

The most important source for Frank's life is his autobiography. It was published in 1802 at Vienna, and deals with his activities up to December 24, 1801, that is, when he was 57 years old. Frank died at Vienna on April 24, 1821. Unfortunately, he never continued the story of his life to cover this later period, but it is available from other sources.

* The autobiography, of which this title is an exact translation, was published in Vienna by Karl Schaumburg & Co. in 1802. The copy used in the translation is in the Library of the New York Academy of Medicine.

From 1795 to 1804, he was professor at the medical school of Vienna and director of the Allgemeines Krankenhaus. In 1804, however, disgusted by the enmity and intrigues of opponents, Frank left Vienna for a post as professor of clinical medicine at the University of Vilna. After only one year in Vilna, he was called to St. Petersburg to become physician-in-ordinary to the Czar and director of the first Medico-Chirurgical Academy with a salary of 42,000 rubles. After three years in St. Petersburg, Frank was attacked by dysentery and went to Moscow for treatment. Following his recovery, he decided to return to Vienna, but before he set out on the homeward journey the Russian government purchased his valuable library for 20,000 rubles and Czar Alexander I bestowed upon him an annual pension of 3,000 rubles.

In 1809, Frank returned to Vienna with the intention of settling eventually in Freiburg im Breisgau. But the outbreak of war between France and Austria compelled him to stay in Vienna. On two occasions during this campaign, Napoleon consulted Frank and invited him to come to Paris, but Frank very tactfully declined the invitation.

On October 14, 1809, peace was signed at Vienna between France and Austria, and Frank moved to Freiburg. However, even this beautiful city was unable to hold him long, for in 1811 he was already on his way back to Vienna. It may be that the death of a daughter during his stay in Freiburg led to this decision. At any rate, Frank spent the remainder of his life in Vienna, where he practised as a consultant and completed his monumental *Medicinische Polizey*. He died six years after the Congress of Vienna.

The autobiography of Johann Peter Frank is an historical document of importance on two grounds. In the first place, as we have already pointed out, it is the basic source for our knowledge of Frank's life and work. In the second place, however, its significance lies in the contribution that it makes to the social history of the eighteenth century. Frank is a representative of the Enlightenment, especially of that version known as the philosophy of enlightened despotism. He spent his life in the service of various rulers, great and small, and from his story one learns what it meant to be a public medical official in an atmosphere of absolute monarchy, cameralism, and the police state.

Unfortunately, very few of Frank's writings have so far appeared in English translation. For the reader who is interested in learning more about this important pioneer, the following may be consulted:

The People's Misery: Mother of Disease. An address delivered in 1790 . . . . translated from the Latin, with an Introduction by Henry E. Sigerist, *Bull. Hist. Med.* 9 (1941)81-100.

The Civil Administrator—Most Successful Physician. . . . translated from the Latin with an Introduction by Jean Captain Sabine, *Bull Hist. Med.* 16 (1944)289-318.

For accounts of Frank's life, see: K. Doll. *Dr. Johann Peter Frank 1745-1821. Der Begründer der Medizinalpolizei und der Hygiene als Wissenschaften. Ein Lebensbild.* Karlsruhe, G. Braunsche Hofbuchdruckerei und Verlag, 1909.

Leona Baumgartner and Elizabeth M. Ramsey: Johann Peter Frank and his "System einer vollständigen medicinischen Polizey," *Ann. Med. Hist. n.s.*, 5 (1933) 525-32; 6 (1934)69-90.

Henry E. Sigerist. *The Great Doctors.* New York, 1933.

MANY YEARS have passed since I reached the summit of the hill which had been assigned to me as the course over which I would run my race. On the other side, perhaps close at hand, perhaps farther down in the valley, the grave awaits me, yet I do not fear it. Meanwhile, I listen thankfully to the voices of my children, and of those whom I regard equally so, my numerous students. They gently insist on the story of my life, and it is important to them; but is it also important to the multitude for whom they intend it? . . . Oh, indeed! Friends at least, and enemies I think, may—each in their fashion—make use of it. The bright spots in my life are for the former; the shadows which it casts upon me for the latter; and the whole for the presumably more objective descendants of all.

Pythagoras says: "A human life resembles Homer's shield, in which, no matter how long one looks at it, one can always discover something new." In such a portrayal should the subject himself direct the pen, or should it be left to others? This is, I admit, a question that is difficult to answer to the satisfaction of all. Nevertheless, if I do not err, a biography is nothing more and nothing less than an account of a journey, which is best described by the traveler, particularly when enough witnesses are still alive to confirm the truth of his tales. Many a person, if he were able to attend his own funeral services and listen to the story of his life, would either steal away fearfully, or at least (if he had laid aside with his mortal frame only the coarser sides of his vanity) would have to redden with shame and cover his face with the shroud. Why, then, leave that which one knows best for others to say (assuming that after one's death there will be something more to say than just: He was born, he lived, and he died)? Therefore, I am writing my own story up to the present. The remainder, presumably very little, may be added after the completion of my arduous journey, if it appears to be worth the trouble, by those who knew me intimately.

I seriously advise those who are to be future citizens of the world to choose for themselves parents who are vigorous, intelligent, and good-natured, whatever their station in life may be. Not only in the case of hunting dogs and horses does it depend on the race whether they will be endowed in greater or lesser degree with those qualities that are necessary for the fulfillment of their destiny. As this counsel is based on experience, there is no reason why I should not take this occasion to speak

first of my parents, as poor as they were, and then in more detail about myself, since their small story is not commonplace, nor entirely unworthy of the reader's interest.

Niklas Frank, my father, was the only son of a French army purveyor, a native of some French province of which I do not know the name, who had settled at Montroyal, a mountain fortress situated near Trarbach in County Sponheim which was then occupied by the French, and had taken a German wife. When the fortress was razed by the French themselves, the garrison took the field in the War of the Spanish Succession, and with the troops went my grandfather together with his nine-year-old son. He directed his wife to betake herself to her relatives in Mannheim, or, if these should have fled because of the war, to those in Heilbrunn.

Soon after his parting, my grandfather was murdered by a party of hostile marauders, and robbed of all he possessed. His son was now supported and cared for out of pity by the officers of the regiment, and had to follow the army. A few years later, while the army was at Ladenburg near Heidelberg, this boy, without understanding a word of German, and without attracting attention, left the French army and crossed the Rhine. Hardly had he reached Kaiserslautern when his supply of food was used up. He appealed for help to a tradesman of this town, addressing him in his own tongue. The man took pity on the boy, and kept him in his house, so that through association with him his own children would be able to learn French. Little by little, Niklas, who showed intelligence, great industry and extreme honesty, won the favor of the kind-hearted tradesman. Although unable to read or write very much, he was employed little by little in the business. Thus several years passed, during which the honest tradesman, whose name unfortunately has not come down to me, gave his foster-son an annual salary, which he did not squander but was able to save. When Niklas reached manhood, his benefactor let him go with the advice to visit the fair at Frankfurt immediately, and to invest only half his small capital in all kinds of drygoods, and then to go and sell these goods in the nearby western part of the Reich, where there were no peddlers. So it happened, and Niklas soon acquired some wealth through his retail trade.

After a few years, Niklas became acquainted with my maternal grandfather, Theobald Würz, a well-to-do citizen and mayor of Rotalben,

a village belonging to the Baden-Baden manor of Grävenstein in Wassgau between Zweybrücken and Landau.[1] Because of his honesty and intelligence, Würz entrusted him with the supervision of two glass-works belonging to him, but without Niklas having to neglect his own business on this account. Under such direction the glass-works were soon almost twice as profitable. One time, old Würz was already at his window at four in the morning, and was looking down at the yard without being noticed. Here he saw that one of his young servants was petulantly kicking before him an apple that had been lying on the ground. At that moment Niklas appeared on the scene and boxed his ears soundly because he had not picked up the apple, and at least given it to his master's cattle. These proofs of loyalty won for Niklas the affection of his superior to such an extent that when he was thirty the latter gave him in marriage his daughter, Marie Margret Würz, who was only fourteen years old, but well-built. With her my father had fourteen children. Little by little he acquired considerable land, and developed this property himself with such untiring industry that he obtained a not inconsiderable fortune, and the reputation of being the most industrious man in the entire district.

Many years of married life already lay behind him, when Niklas because of some indisposition had to miss the Easter fair at Frankfurt and to leave the purchase of the things he needed to his business friend, Paul of Pirmasens. The latter set out for Frankfurt, and stopped at an inn in Sachsenhausen. Because it was wet and cold outside he stayed at the inn for a while. Sitting in the common room, he noticed an ancient granny, who was neatly dressed, and was very busily occupied in spinning. He began a conversation with her, and learned that this old lady, who was over ninety-five, was forced, because of various misfortunes, in part to earn her living. "If only I had my son," she said crying, "I would very likely not be in this situation!" Now followed the story of her loss. She described her earlier happier state, the place where she had lived, and mentioned the names of her husband and child, of whom she

[1] Rodalben is a small town near Pirmasens in what is now the Bavarian Palatinate. In Frank's days it was a part of the manor of Grävenstein, consisting of the Catholic towns of Rodalben, Münchweiler, Klausen, Merzalben, Petersberg and Leimen. Grävenstein was then a possession of the margraves of Baden-Baden. Frank was born in the reign of Margrave Ludwig Georg, the penultimate prince of the Catholic Bernhardine line of Baden-Baden. The spelling Rotalben, as given by Frank, is incorrect but was used.

had never heard anything more. From all this my father's friend learned that in the strangest way he had discovered my father's mother; only the fear of disappointing himself and the old woman led him to resolve not to speak to his friend about this occurrence until his return. My father did not waste a moment in discovering the truth. All the circumstances coincided precisely. My father's mother, for it was she, had not found any of her relatives at Mannheim or Heilbrunn. All of them had fled because of the war. Bereft of her husband and son, the unfortunate woman had come to the place where she was now found, near the place where for so many years her son had lived without knowing that his mother was so close to him. After the little ready money that she had was gone, the family with whom she now lived had taken pity on her, and she had found a home with them. Now the happy mother embraced her children and grandchildren, and lived to the age of one hundred and five.

I was born at Rotalben on March 19, 1745.[2] Despite his love for his family, my father, who had been raised as an orphan, and had made something of himself only by exerting his energies to the utmost, always retained a harsh streak in his otherwise good-natured character. His fits of rage were often frightening to his children. On one such occasion, when I was nine months old and my mother to quiet my loud cries put me at her breast, he ordered her to leave the room with me immediately! She, however, hoped that she would be able to quiet me. The order was repeated a second time, and when he saw that it was of no avail, he tore me from my mother's breast, and threw me out of the house through the open door. Immediately he realized what he had done, and in despair regretted his rage. On the other hand my mother had the kindest, most gentle character, and in every respect was far above the social station into which she had been born.

One summer day, when I was about four years old, I was sitting alone in front of our house, building a little house out of sand. Suddenly some twenty peasant boys, who were playing there too but probably had not seen me, fell over me. My mother, who thus suddenly lost sight of me, dispersed the boys with her frightened cries. I lay on the ground almost

[2] Johann Peter Frank must have been one of the last of the children in his family, for as a seven-year-old he already had a married brother.

suffocated and crushed, and from that time on I had frequently recurring attacks of asthma that disappeared completely only when I was eighteen years old. At that time my father dealt in salt. I do not know what pleasant taste I found in it, but I did consume a considerable quantity of salt every day; and this was probably the cause of the very distressing burning pain on urination to which I was subject for many months. Soon thereafter a large gland in my neck became acutely inflamed and began to suppurate, producing a considerable swelling. Nowhere in the entire district was help to be had. A regimental surgeon from Pirmasens who was consulted, doubted that I would recover, because, as the learned man gave to understand, one of my nerves had burst asunder! On her own responsibility my mother had this swelling opened by a barber who could hardly be induced to perform the operation, and in this way I was once again saved from suffocation. These circumstances, as well as my extreme susceptibility, prevented my father from using me in his hard work as much as he wanted. After he had taken me with him several times in bad weather to Dieuse in Lothringen (Lorraine), and to the fair at Frankfurt, he must have convinced himself that I was not suited for his business, because he said to my mother, after his fashion: The boy is a square peg in a round hole. My mother turned this remark to my advantage, and I was treated with more consideration because of my weakness.

Soon I recovered my strength. With other boys I attended the village school, and although my teacher frequently said that I even knew how to read the Bible, I received many a blow like the others. Once when I was six I came home crying. Questioned as to the reason, I said, sobbing, to my mother: "I am very unhappy to be raised so strictly." To the question, why? I replied: "Because all my school companions are allowed to run about without stockings, while my feet almost suffocate in shoes and stockings!" Aren't the complaints of entire peoples against salutary regulations frequently just as childish?

Finally, when I was seven, my mother sent me to live with Johann Frank, one of my older brothers who was already married, at Eusserthal near Landau. There, for two years, I received instruction appropriate to my age. When I returned to my paternal house, I expressed a desire for further instruction, and asked my mother to allow me to study, without knowing exactly what this meant. At first my father rejected this idea.

But my good mother, who in secret nursed the pious wish to see me dedicated to the church in case I did study, by entreaty obtained permission to send me to the Latin school of the Piarists at Rastadt in Baden. Here, for two years, I was left to my own guidance, which was probably for the best. I learned very little, but at the same time I was not led astray, and lost some of the roughness of my first rustic training. Many things probably contributed to this, among them the frugality with which I was maintained. For my pocket money there had been set aside only one *groschen* a week, which I had to fetch on a certain day from the wife of General von Dreger. Often I was greatly depressed by a debt burden of three or four *groschen* for fruit that I had purchased. Then for the rest of the month I kept away from the spot where my creditor, the woman who sold fruit, was to be found, until finally, red with shame, I was able to settle my debts.

One anecdote I ought not to omit here. At the age of ten, I had a very pleasant soprano voice. The pupils of the Piarists often presented plays in their theater. One time I was given a female part, where my singing of a beautiful aria was received with such loud applause that the reigning Margravine, who was very fond of singing, conceived the idea of sending me to Italy, presumably to have me gelded so that I would retain my soprano voice. However, the aforementioned general assured her that as the son of a well-to-do citizen I had no need to purchase my maintenance so dearly.

Finally, I returned to my home because of an acute quartan fever that had attacked me. At that time there was still considerable prejudice against Peruvian bark, so that when other remedies proved to be of no help, I was told to go to a nearby brook carrying a crayfish in my hand, and to throw it backward into the water. Even now I still take pleasure in the fact that I placed no trust in such a silly business; instead, on returning from the stream I told my mother that in the course of my expedition, the crayfish almost laughed himself to death. The reward for such mockery, however, was that I still had my fever for a long time, and missed a good deal of schooling. Finally my father sent me off to the Jesuit school at Bockenheim (Boucquenom) in nearby Lorraine. My industry grew daily, but only rarely did I reach the top of the class. I had the greatest aversion to learning things by heart, and was therefore never able to recite my lessons properly, no matter how well I under-

stood their content. Because of this I had to suffer more than one humiliation. Here, too, I withstood youthful temptation. As I found great pleasure in music, I began to learn a wind instrument. My good teacher, who regarded me as much too weak for such things, forbade me very strictly to continue with it, and advised me to take up string music. This passion for music has remained with me up to the present, even though I never got very far in putting it into practice.

After three years I was sent to a school in the Margraviate of Baden to learn rhetoric. My teachers soon noticed that I showed considerable interest in this subject, as well as in poetry, and they felt that with my talents I was capable of going on to more advanced studies. After this year of schooling, my mother was advised to send me to France to complete my philosophical studies. As a result, I went to Metz in 1761, and the next year to Pont-a-Mousson, where P. Barlet, a very learned and famous Jesuit, taught physics. The physics museum was so splendidly arranged, and I became so attached to this science, that later in the same year after receiving the doctorate in philosophy, I chose to study medicine because it was affiliated with physics, and to the great sorrow of my pious mother, abandoned all intention of becoming a cleric. My father was likewise very dissatisfied with my intention, and declared that because of the great expense involved, he would be unable to support me. I was disconsolate, and found it impossible to agree to the choice of any other profession as a substitute for my favorite study.

There was, however, still another reason for my state of mind. At Pont-a-Mousson, I had been recommended to M. Pierron, a tradesman, and had been very kindly received in his house. He had a very beautiful and extremely well-educated daughter of my age. Without knowing anything about love, I loved this excellent creature with all my heart. Because of shyness I did not reveal my feelings to her until I saw myself forced to leave her. The first and last time that I was able to speak alone with her, she admitted, with equal shyness, her favorable inclination toward me, adding that if I had not been on the verge of departing from her, she would never have revealed her feelings toward me. I could hardly grasp my good fortune, and at the same time could hardly contain myself for fear that I would have to give it up immediately, when the object of my love and the cause of my despair left me. At least, I called after her, at least may I see you again one day, and if I have been worthy of

you, may I offer you my hand? . . . A pitying glance and a gentle tear rolling down her beautiful cheek were the answer to my question.

In the meantime, as my father still refused to let me study medicine, my brother, whom I have mentioned above, took my side, stating that if this were the case, he would use his own slight fortune for my purpose. This, and the encouragement of my mother, whom he had previously won over, finally won for me permission to go to the nearest university, Heidelberg, because otherwise I would be of no earthly use anyway. Here I began to study medicine.[3] My love for science and my physical weakness spurred all my energies. First I attended the lectures of Professors Gattenhof[4] and Schönmezel. The former, one of von Haller's best students, a very learned and excellent man, lectured on Boerhaave's Institutions. The latter, a student of Winslow, Petit, Levrêt and Sauvages, taught anatomy, surgery, and obstetrics with great clarity.

At the end of the school year, I was in danger of giving up medicine forever. I was completely dissatisfied with what I had learned so far. Fortunately, I went to Gattenhof and told him candidly that although I had applied myself with considerable energy, I was not aware of having made any progress in the science, and was therefore thinking of giving it up completely. "I don't understand this," replied my teacher. "You have all the necessary talent. You have applied yourself industriously. If in view of all this you have learned nothing, the fault probably lies with your teachers." He asked me to return the next day, when he examined me alone. In my replies I probably showed that I knew more than he felt he could justifiably demand of a first-year medical student. "Are you still of the opinion," he said with visible satisfaction, "that you have learned little or nothing?" Nevertheless, I still remained of the same opinion, because I could not see how to make use of what I learned. Twenty-two years later, when I myself had to arrange a course of medical studies for the school at Pavia, I recalled my difficulty as a student and tried to overcome it by arranging that in the teaching of dry theoretical subjects, the students should never be allowed to lose sight of their ultimate purpose.

As soon as vacation came, I took the little money that I had carefully saved all through the academic year, and with the greatest secrecy set

[3] The date of his matriculation at Heidelberg was November 23, 1763. (23. November. Petrus Franck Rodalbensis ex Marchionatu Badensi, med. cand., Toepke-Hintzelmann, *Die Matrikel der Universität Heidelberg*, IV, 212).

[4] Georg Matthias Gattenhof taught at Heidelberg from 1750 to 1788.

out for Pont-a-Mousson. I found the object of my love touched by this evidence of my constancy. I was permitted to hope, if my future progress in science would appear as advantageously as did my love.

The following year I had the good fortune to be admitted to Gattenhof's home, to accompany my kind teacher on his botanical excursions, and to be permitted to request enlightenment on any doubts that came into my mind. I repeated the lectures of the previous year, and attended Gattenhof's lectures on materia medica. As far as chemistry was concerned, there was little doing in Heidelberg at that time. The famous Palatine Physician-in-ordinary, Privy Councillor and Professor von Overkamp,[5] an excellent student of Boerhaave's, lectured on the Aphorisms of his great teacher. I attended these lectures with the greatest effort. Overkamp paid more attention to his duties as physician-in-ordinary than to his professorship, and consequently often had to interrupt his lectures for 14 days and longer. When he did lecture, his fits of coughing and his habit of continually clearing his throat made it very difficult to grasp the meaning of what he said. Once in the company of several of my fellow students I deplored this as an obstacle to a more perfect education. This remark of mine did not remain unknown to the professor, whom I actually respected very highly, and was taken very much amiss by him. Dr. Harrer, another fine teacher, lectured on physiology. He was a student of the two other professors of the university, but he was so much at odds with them that what he said in his lectures was generally diametrically opposed to the other teachers. Harrer had formerly been an instructor in philosophy, and had acquired great skill in the art of syllogistic debate. A distant relative of mine, who enjoyed the favor of the Elector Palatine, advised me very emphatically to attend diligently the lectures given by Harrer, who had won the favor of the Elector (and whose personal physician he later became). He assured me that in this way I would indubitably obtain a position in the Palatinate. I took this hint, and in the first lecture Harrer made a great show of his learned fencing. In the belief that I was not so completely convinced of his assertions he called upon me to state publicly my confession of faith. I admitted that I was of another opinion. Harrer had recourse to his syllogistic weapons, and compelled me to make use of the same weapons

[5] Franz Joseph von Oberkampf taught at Heidelberg from 1748 to 1767. Frank mispelled the name, Overkamp.

against himself in the presence of his auditors. Unfortunately, the victory, which was not a very difficult one, remained on my side. Harrer now lost his temper, resorting to expressions that led me to leave the lectures and never to attend them again. Soon thereafter, my relative pointed out to me in a most serious vein that I had forfeited my happiness, but I did not let myself be talked into apologizing.

In 1765 I moved to Strassburg. Here I attended the lectures of Spielmann,[6] Pfeffinger, and Lobstein.[7] As I knew that he himself had never seen a patient, Spielmann's lectures on pathology according to Gaub made no impression at all on me. Lobstein lectured in most learned fashion on the principles of surgery, but in a tone of voice that put one to sleep. On the other hand, this worthy man gave excellent instruction in anatomy. I became well versed in dissection, and a number of my fellow students soon gained so much confidence in me that they requested me to review physiology with them. I did this gratis, and in teaching them learned much myself. The famous teacher Fried[8] no longer taught obstetrics. Consequently, I chose to study with the accoucheur Weigen, from whom I obtained enough opportunity to train myself in obstetrics. Because of age the experienced Leriche, Surgeon-General of the French Armies, was unable to demonstrate surgical operations as he used to do. I regretted this greatly, but attended the demonstrations on the same subject of his skilled son.

I took an extremely great interest in acquiring practical knowledge. There were two ways to do this; in the civilian hospitals and in the military hospitals. The former had two sections; in one Catholics were treated, in the other Protestants. What medical purpose this served, I do not know. I inquired as to which of the two hospital physicians was considered more skilled. All agreed on the Protestant, and I put myself under his guidance. Numerous other young physicians also accompanied this able physician, Dr. Böhm, when he visited the patients, all too many, whom he treated. In order to obtain still more opportunity for improving myself, I went to the military hospital, and applied to Dr. G., who had often been consulted by the Badenese court. I received permission to accompany this skilled French physician on his rounds in the hospital.

[6] Jacob Reinhold Spielmann (1722-1783), apothecary and professor of medicine at Strassburg. There is a full figure silhouette of Spielmann in his *Institutiones materiae medicae* . . . Strassburg, 1784.

[7] Johann Friedrich Lobstein (1736-1784), professor of anatomy and surgery in Strassburg.

[8] Joh. Jacob Fried (1681-1769).

He visited more than 200 patients there. On his right stood a surgeon; on the left an apothecary; then followed the orderly on duty. The surgeon and the apothecary each kept a list, the former of blood-lettings, clysters, blisters, and so on, the latter of cathartics and other medication. Bed No. 1—Here the doctor glanced to the left and right at the two lists. "Jean," he said, "how are you?" "Very bad, Doctor," was the reply. "Have you been bled?" "Yes, sir!" "Have you taken the purge?" "Yes, sir!" In the meantime the physician felt the man's pulse for a moment with two fingers, and called out in a loud voice: "Bleed him!—Purge him!" While the surgeon and the apothecary were noting these orders as quickly as possible, the doctor was already at the next bed, repeating the same questions and orders. In a half hour we had visited all our patients. I was horrified at this mode of procedure; nevertheless I returned to the hospital for three successive days. However, I found it impossible to witness such a state of affairs any further and renounced such instruction. G. took this lack of confidence on my part with such ill grace that I was accused before the minister of the Badenese court of being remiss Böhm treated me more justly.

In the summer I left Strassburg. The sincerest love for my incomparable Katisch (Katharine) had protected me from all depravity in this seductive place. I lived only for her, and the thought that by applying all my energies to science I could render myself worthy of her and hasten my happiness, enabled me to overcome successfully all difficulties, no matter how great. On the occasion of a repeated visit, she was extremely satisfied with my training, and now I finally obtained from her the promise I had so long desired, that despite all obstacles she wanted to become mine. True love is neither too forward nor compliant. Ours was as pure as the sun.

Now I returned to Heidelberg to submit to the academic examinations. Overkamp, as Dean, received me very coolly. "You are still very young," he said, "to become a doctor." "Unfortunately, I am," was my reply, "but perhaps not unworthy of your attention and good-will!" At that university it is customary to precede the final examination with a *Tentamen* lasting three hours, which is much harder. In this ordeal I was very fortunate because Overkamp who had pressed me hard was again won over completely to my side. Hardly an hour had elapsed when I was told to retire. Fear filled my being at this unusual procedure!

I regarded myself as the most ignorant, the most unfortunate of all mortals. After only a few minutes, however, I was summoned again, and the Dean informed me in the name of the Faculty: because they were so extremely well satisfied with me, I was excused from the remainder of the preliminary examination. The result of the final examination was likewise very favorable for me. Not unjustly, I ascribed my triumph to love, for it had played a most important part in my industry and my rapid progress, something that is rare indeed. In Strassburg, I had already written my inaugural dissertation, *De educatione infantum physica.* I gave it to Gattenhof to judge. He praised the idea, but felt that the execution of it had been less successful. He promised to revise and to shorten it for me, and wrote the fine dissertation, *De cunis infantum,* which appeared under my name, and which I defended publicly on August 26, 1766 before a large audience. In my *Delectus opusculorum medicorum,* published at Padua, I named the true author of this treatise; nevertheless, it was later translated into German, and two years ago also into French, and again ascribed to me, which I did not deserve.

Before I left the university, I was called to Privy Councillor v. Overkamp. "You are very talented and diligent," he said, "and therefore have a right to want to distinguish yourself one day. For this reason pick some subject now on which you would like to work in addition to your professional activities. In three days I expect your answer." I excused myself with my youth, my inadequate knowledge of those fields that needed more cultivation and yet would not exceed my ability. My excuses were rejected, and I was told to return at the appointed time. Great was my embarrassment in the interval! I appeared fearfully before my teacher, and said that I had considered all the branches of [medical] science without finding one that I felt capable of improving. "However," I said, "in the meantime one idea in particular has forced itself upon me. I see that physicians are rarely in a position to remove such causes of disease as either act on people in the mass or are independent of the will of individuals, no matter how careful they may be. Many of these could be removed through governmental measures. Is there a systematically developed science that contains rules according to which such an aim could be achieved?" "We have," replied the professor, "various individual regulations that belong in this field, but no connected scientific system of this kind has yet been developed. Your idea is a happy one. What

would you call your brain child?" "From a medical point of view the object of my investigation would be fixed," I replied, "and since the administration of measures dealing with the health of the public would for the most part have to be left to the police of a country, it seems to me that the name Medical Police would be very appropriate for the subject." My teacher was also in complete accord with this, and once more he urged me very seriously not to abandon my intention.

Now I returned to my parents who had done so much for me. As there was no trained physician to be had, except in the nearby town of Pirmasens, unless one travelled five hours, I soon had a number of patients to treat among the rural population. I had the good fortune to deal successfully with several striking accidents, and for a beginner I did well enough. Yet I could not decide to live alone in a village, deprived of all scientific intercourse. I therefore petitioned the court of the Margrave of Baden-Baden for permission to practise medicine in the Prince's capital city, Rastadt. Presumably because of the aforementioned unfavorable report of the Strassburg military physician G., I received the reply: ". . . that the request could not be granted as long as I had not practised my profession for some time in a hospital or in a city." I recognized bitterly the meaning of this statement, and looked around for some other place.

At that time my brother Martin Frank lived at Bitsch in Lorraine. He wrote to me that in this small city there was only one physician, a Dr. Landeutte, and he did not know German, so that everyone there wished to have a German doctor settle among them. Immediately I decided to meet this desire. My reception was very polite, but because of my youth I could not expect that the people would immediately have full confidence in me. An old ignorant bath-house attendant already possessed this confidence so completely that the garrison doctor stationed there only rarely had any patients to treat, aside from the military. After several weeks I was summoned to the Lieutenant du Roi, who inquired from whom I had received permission to practise medicine in France. I appealed to my medical diploma, and expressed my amazement that such a question should be put to a graduate physician, when it was thought possible to entrust the health of the citizens to an ignorant bath-house attendant. The Lieutenant du Roi in return referred to an existing royal order, and directed me to the university at Pont-a-Mousson

if I wanted to settle in Lorraine as a physician. Not the examination, but the new expenses connected with it discouraged me; in the meantime I had to accept the situation. I even considered myself fortunate, because in this way I came back sooner to the place toward which my desires were always directed anyway. When I applied to Professor Jadelot, the dean of the Medical Faculty at Pont-a-Mousson, he informed me that I would have to submit to a new examination, and would also have to publish a thesis and defend it publicly. I realized that I would not be able to stay there as long as would be necessary to prepare even a moderately good inaugural dissertation. As I had brought with me a considerable number of copies of the dissertation I had defended in Germany, I conceived the idea of changing the title-page, and having a new one printed here. The Dean agreed to this. I was then examined, and passed to the satisfaction of everyone. At all the street corners a poster written in Latin announced the day when a foreigner would be graduated by the Medical Faculty. At the appointed hour a university proctor appeared in my dwelling bringing me a long black toga, and a black cap shaped like a sugar-loaf, adorned with a silk tassel on top. As I had not ordered a carriage, I refused to go through the streets in such a garb, but all objections were rejected. In this costume, without arousing much interest, I went to the great hall where I was to defend my propositions. Although it was vacation time, I found a large number of people of all kinds collected there. Because I was already a doctor of medicine, two lecterns had been set up; one for the chairman, the elder Professor Jadelot, the other, somewhat lower, for myself. A scholar attacked my propositions in French, and as I was well versed in this language I answered his objections to the satisfaction of all. There was, however, among the so-called corollaries that were appended to my dissertation, one that dealt with small-pox inoculation, and denounced the prohibition of this operation as injudicious. A priest, who was a member of a religious order and also a professor at this university, vigorously attacked this proposition, and declared very impetuously that I "a foreigner was bold indeed to cast aspersions on the conduct of the chief parliament of France, which recently had energetically forbidden smallpox inoculation." Jadelot, who sat behind me, whispered: "This man is dangerous. Be careful!" I realized the critical character of my position, and said to my opponent in his native tongue "that I as a foreigner knew nothing of this new prohibi-

tion, and indeed had not the slightest intention of reproving the actions of such an august body, even though I personally could not approve of them." To the very attentive audience I now admitted that my dissertation had been printed in Germany only seven weeks earlier, and had been given simply a new title-page. I asked that my statement be regarded purely as a medical proposition. "But you, Sir!" I continued, "to whom as a debater victory appears to be very important, would have to be ashamed of your victory if unequal weapons were employed between us. French is not my native tongue; let us therefore use that of scholars, namely, Latin (for I knew that but few French scientists liked to use it), and do me the favor to repeat your objections in that language!" My opponent was extremely perplexed by this turn in the situation, and forced himself to stammer forth a few incorrect Latin words. At this, the audience, which appeared to dislike him anyway, broke out in laughter, and applauded me with a loud Vive l'Allemand!

On October 10, 1766, I was registered as an approved physician of Lorraine,[9] so that there was nothing more to prevent me from practising my profession in this province. I hastened victoriously to the arms of my beloved, and received permission to ask her father for her hand. As the father wanted his only daughter to be happy, he approved her choice. We agreed that until our marriage should take place, she would stay at a convent in Boucquenom and learn something of the German language. Several months later I saw her again, and as she appeared to be making little progress in this difficult tongue, our marriage was not postponed any further, but was celebrated on February 26, 1767. I hardly knew how to describe my joy. Mortals can never achieve anything greater; but, unfortunately as human joys tend to be, it was of very short duration!

Little by little, I found quite a good deal of work in Bitsch and the surrounding districts. As I had no fixed salary, the fees from my practice did not suffice to cover my absolute necessities, and often I had to resort to my mother's kindness. How many young physicians, who lack such sources, and, as I did, marry before they have a secure income, must repent such rashness the rest of their lives!

I had been in Bitsch not quite two years when I decided to return

[9] The phrase used by Frank is: "dem Kollegium der Lothringischen Aerzte einverleibt."

to my native land. I now received permission to settle in Baden, in the Margraviate. Here there was only an elderly physician, an adherent of Stahl's school of thought,[10] who had formerly been personal physician to the Margrave of Baden, but who, several years ago, had retired with a pension to this spot where he was medical officer for a large district and enjoyed the salary attached to the position. I decided to gain the friendship of this experienced physician, Court Councillor Bellon,[11] and to use it for my improvement. However, as he was now much given to drink, and had no desire to see a second physician enter his preserves, my efforts to win his friendship were at first of no avail. After a short time I gained the confidence of the local public, and of the many strangers who visited this famous bath in the summer. A year later, Bellon had become completely senile and was almost useless. In consequence, the court appointed me to carry out all the duties of the district medical officer and gave me 100 florins from Bellon's salary, but with the reservation that when the position became vacant I was to have no prior claim to it (for Dr. Glückherr, a court physician, had his eyes on it).

Both in Bitsch and in Baden I worked with untiring diligence to improve myself. Keeping in mind my teacher's remarks, I had labored valiantly at my work on medical police, and was now resolved to have such a book published in one volume. As a result, I looked around for a publisher, and thought I would make him a rich man with my work. Maklot, a bookseller at Karlsruhe, was to be the recipient of this good fortune. He told me that he first wanted to have an expert opinion on my manuscript. A few weeks later I received my work with the comment that the expert had not approved it. "What? Expert?" I exclaimed, red with shame, and threw the letter from me. After a brief interval, I read the rest of the letter, and discovered that the man who had so disparaged my work was an excellent statesman, Privy Councillor Reinhard of Baden-Durlach. How humiliated by this development was my youthful scientific conceit! This humiliation had an exceedingly great effect on me.

[10] Georg Ernst Stahl (1660-1734), from 1694 to 1716 professor of pathology, physiology, botany and pharmacology at Halle. In 1716, Stahl left Halle for Berlin where he became court physician. Stahl developed the phlogiston theory of combustion, which was not displaced until Lavoisier's discovery of oxygen. He advocated a vitalistic theory of disease, asserting that disease is simply the tendency of the life principle (*anima*) to reëstablish the normal state of the body as rapidly and efficiently as possible.

[11] Georg Martin Bellon, doctor of medicine and philosophy, wrote a book on spas in Baden entitled *Tentamen Physico-Chymico Medicum in Origine Thermarum Badensium.*

Instead of improving my work, I made a second stupid mistake. I took my despised manuscript with both hands, tore it furiously into a thousand pieces, and delivered these to the flames. Would it not have been more intelligent, if I had kept this youthful work, which was probably not quite so bad, to reread it in later years and thus to see how much progress I had made? That is what an excellent Italian sculptor did. Over the door of his house he had set up several mediocre figures, which, in reply to my inquiry, he told me were his own work. When I asked why he had kept them, his answer was that from year to year the wise man judges himself by his own work. In addition, everything that I had previously read, and had abstracted from useful books concerning my subject, was forever lost. These were my reflections when, after calming down, I began my work again. However, I learned so much that I observed more than the Horatian *nonum prematur in annum*, and now spent eleven years in preparing alone the first volume of my Medical Police.

Reader, spare me from saying much about the most terrible fate that now befell me. Eleven months after our marriage, on January 2, 1768, my excellent wife had made me happy with a son, but already on the fourth of that month, she, whom I had so dearly won, was no more! A dreadful childbed fever had attacked her immediately on the first day after her delivery. It was impossible for me to treat her myself. A physician who was summoned from Rastadt bled her twice, because he considered the case one of inflammation of the intestines, whereupon she swooned repeatedly, and finally expired. Before this happened, I was torn from her side, and dragged to the house of my friend. As I had neither eaten nor drunk anything for three days, I was forced to sit at the table next to my friend Court Councillor Braun and to eat something. Hardly had I taken the first bite, when I heard the death-knell. On the spot, I suffered such a severe nose bleed that I was put to bed in an unconscious state. An apothecary who was called as quickly as possible, for lack of a physician, gave me a strong dose of opium, whereupon I fell asleep for thirty-six hours. During this time, my forever unforgettable one was buried.

Still, there remained with me a dear pledge of her love! Only this could reconcile me to live. The wife of a friend of mine, who had likewise given birth a few days previously, took pity on my motherless son,

and suckled the child together with her own. Six months later my mother came to Baden, and urged me to leave my son with her for the first few years. As a very virulent smallpox prevailed in the city, I agreed. During the trip the child began to show signs of impending smallpox, and only a few days after the appearance of the rash, he was snatched from me.

According to the customs then prevailing in Lorraine, because no marriage contract had been drawn up, the fixed property of the deceased, despite the fact that her child had survived her, was inherited neither by myself, nor by my father-in-law, but rather by her maternal family. I had a claim only to the mobile property. As my old father-in-law would have been greatly embarrassed by my claim, I voluntarily ceded it to him, feeling that in this way I was honoring as best I could the memory of his daughter.

For some time I was unable to continue my work. In this condition I received an order to proceed, together with Court Councillor Dr. Bellon and Court Physician Dr. Glückherr of Rastadt, to the nearby town of Gernsbach (in the Badenese County of Eberstein), and to investigate a very dangerous epidemic. After carrying out this mission we went to Rastadt to speak with the personal physicians of the Prince about the epidemic, and then to deliver our joint report to the government. Owing to the illness of the Margrave the physicians were unable to see us before the following day. On this occasion I was able to convince myself that friendship and enmity among men often rest on very shaky grounds. Since I had come to Baden Dr. Bellon had given me various proofs of his hostility, which I was unable to overcome in any way. We had undertaken our small trip without any servants, and had to spend the night at an inn in Rastadt. In taking off his shirt, Bellon who was accustomed to a great deal of personal service, was unable to get out of it because it was securely fastened at the neck. I hastened to help him, and carefully put the feeble old man to bed. For this small favor he now embraced me, admitted that he had been mistaken in me, regretted his actions, and assured me of his inviolable friendship. The next morning he felt homesick, and as the doctors were still unable to meet with us, he hastened home, even though the report on the Gernsbach epidemic had not yet been drafted. I requested him at least to leave behind him in writing his as yet unexpressed opinion. He wrote, and when he had

departed, I read the following: "I the undersigned am of the same opinion as Doctor Frank." After we had presented our report to the government, I received an order to return to Gernsbach, to stay there as long as the epidemic continued and to treat the sick. This I did with much zeal and with such happy success that in six weeks I lost only three of my patients. Prior to my arrival many had died every day from the epidemic. After such a long period of service six Louis d'or were generously given to me as a recompense! Board and lodging I had received free of charge. The disease that I dealt with was a dangerous, so-called putrid or nervous fever with petechial and miliary rash. As the disease began immediately with great debility I applied a stimulatory type of treatment during the first few days. I had been occupied hardly ten days with these patients, when I too was attacked by the disease. As I had been completely well, apart from my emotional conditions, I employed Sydenham's method without losing any time. I took an emetic, went to bed, drank warm, volatile beverages, and, what would now be called good Brunonian treatment, also a bottle of Burgundy. As I was well covered, I soon began to perspire and this continued for forty-eight hours. On the third day I was completely without fever. According to Sydenham's advice I was now supposed to take a purgative, but it appeared to me not to be indicated.

In 1769, Dr. Bellon, the medical officer, died, and his position was now given to Dr. Glückherr, the garrison and court physician. The reigning Margrave appointed me to succeed the latter. However, owing to the fact that an aristocratic lady had very urgently intervened in favor of Dr. Bierenstiel in Rastadt, the Prince divided Glückherr's positions, and gave that clever young doctor the garrison, while I received only 200 florins annual salary. Later I moved to Rastadt. The outlook for science was still very dark there, while in nearby Karlsruhe it flourished. The princely library was rather rich in old books, but for many years nothing had been spent on it, and it had even been closed. P. Lambla, the confessor of the reigning Princess, was in charge of this book collection. At my request I received permission from him to use this treasure. I had to send for the keys every time, but could not get them as often as I would have liked. Nevertheless I did not let myself be put out so easily; never did I spend my free time in a lonelier and quieter place than this court library. The newer writings I had to acquire

out of my own funds, to which my meager salary did not furnish any significant contribution. Between Dr. Bierenstiel and myself prevailed a competition which was very advantageous for both of us, and we exchanged the books that we acquired. As if I had foreseen that I would one day be employed in Italy, I engaged an Italian language teacher, and subscribed to the Florentine newspaper so as to be able to read the writings of Italian physicians. Later this knowledge stood me in good stead. As the two physicians-in-ordinary of the Margrave, Drs. v. Troxelle and Wolff were able to attend only a few patients because of a reported communicable disease at court, most of the patients finally had recourse to me, so that I was extremely busy both in the city and the country. Nevertheless, I frequently consulted with these two older practitioners. During the first years of my employment there, I was called to see a citizen whom Dr. Troxelle had already treated over a long period of time for a generalized dropsy but without success. I did not want to prescribe for the patient without informing his physician, and therefore went to Troxelle who had treated the patient with solvent, mildly purgative and diuretic remedies, in accordance with the then prevalent conceptions of dropsy, and because the patient had a very pallid yellow color. Troxelle advised me to continue the aforementioned medicaments. I replied that this dropsy had been produced by a neglected quartan fever; and that it seemed to me, because this intermittent fever was still active, although much weaker, it was necessary to deal with it first and then with its immediate effect, the dropsy. "With the Peruvian bark that you want to give," said Troxelle, "you will shut up the wolf in the stable, and increase the constipation of the viscera!" "But is this actually present?" I replied. "And if it is present, may it not be like the dropsy, a result of the weakness, or of the fever, and require the same mode of treatment as these?" This opinion was rejected as unorthodox (Troxelle had studied medicine in France). But since I saw that with the previous treatment the patient would soon die, I gave him the Peruvian bark which was feared so much and had the good fortune to restore him completely in fourteen days. This case convinced me that sound reason in no way contradicts experience, which is so highly praised, and that one does not always have to be a graybeard to make use of the former. Soon I was called to a famous ballet master, an Italian named Curioni, who was very popular at the court. He had been attacked by

a very dangerous dysentery. As I found the abdominal pains as well as the urge to stool very severe, and the pulse hard and tense, I bled him five times in three days, and gave him no purgatives, but rather very mild mucous remedies. The doctors and the public criticized my treatment unmercifully, and my growing reputation would have disappeared had the patient done them a favor by dying. Fortunately, however, he recovered. Soon thereafter a report arrived from Strassburg that a number of people there had been attacked by dysentery, but that this illness which had been accompanied by an inflammatory fever had been relieved in most cases by venesection and debilitating remedies. Thus, I was again convinced by experience that if in the case of an imperfect science like medicine we would always leave things as they are, it would never develop its potential possibilities.

As obstetrics had not been learned by any surgeon in this district, much less by midwives, I found myself compelled in serious cases to carry out the deliveries myself. At the request of the Prince, I drafted a plan for the instruction of midwives and surgeons in the lands belonging to Baden-Baden. It was not put into effect, although later it did not escape the attention of the Baden-Durlach government.

In 1770 my relatives and friends urged me to marry again, because they saw that my small competence was being dispersed, owing to lack of attention and because my servant was robbing me. Although I was but little inclined to enter a new union, I followed this advice, and on June 12 married Marianne Wittlinsbach, a daughter of the Chief Clerk of Rastadt. Shortly thereafter I was attacked by a contagious fever. My condition became so bad, that toward the end of the illness I lay in a trance for four hours. Shortly before this illness, I had complained personally to the Minister that my salary was too small. He asked me whether I knew famous old Dr. Wepfer of Switzerland, and I replied that I knew him only by his reputation which was very high. "Now," he said, "I once asked this famous man, why little Switzerland has relatively more distinguished doctors than other bigger countries? To this Wepfer replied: 'Because Switzerland lets 75 out of every 100 young doctors starve to death, with the result that the remaining 25 become rather good physicians.' " I requested the Minister not to undertake such experiments on me, and was of the opinion that many a useful talent had been stifled in this way. After my recovery from the acute illness, my salary was increased by 100 florins.

In the meantime my eighty-year-old father died. Several years previously it had been my good fortune to save his life which was endangered by a strangulated inguinal hernia. On this occasion he had told me, in his fashion, he was now convinced that there was something to this profession that I had studied. He had received the news of my first wife's death with dismay. "That I, an old man who is no longer of any use to anyone, should outlive such a beautiful, fine young woman!" he had cried out. In his will he ordered that I should participate in the property that he bequeathed to his children only if the sum that I had cost him was less than that which could be inherited by each of his six other children. According to the laws of the country, I could have opposed this arrangement. However, I knew that my father was just. I respected his wish, and stipulated only that my brothers and sisters divide the inheritance without quarreling. Not long after this loss followed the death of my excellent mother, filling my soul with the bitterest grief.

In 1771 the health of the reigning Margrave, August, the last Prince of the Baden-Baden line, became shaky, and he began to show signs of dropsy. At a time when the disease was already quite advanced, his personal physicians were ordered by the Minister to consult me too. Although they were quite friendly with me, they refused, for some unknown political reasons, to obey this order. Finally my presence was urgently requested. The doctors had to obey, but I was not permitted to see the sick Prince on the ground that he would consider his malady more serious and would become frightened. The same pretext was also alleged when Professor Strack, who had been summoned from Mainz, was refused admission to the Prince. This famous physician was on the point of returning to Mainz because of this insult when the reigning Princess ordered that we be admitted to her sick husband even without the cooperation of the attending physicians. The Margrave received us very favorably, and reproved me that I had not visited him before during his illness. We found that the disease was far advanced, and no hope remained for recovery. Nevertheless it was important to prolong the life of the Prince as long as possible. Despite all his suffering, the patient remained quite cheerful. As we left him, I heard him say laughingly to one of his intimate friends: "Now I would like to hear what these five criminal judges will decree for me!" Diuretics had little effect. The two physicians-in-ordinary alternated in maintaining the nocturnal vigil,

and one night when Dr. Wolff was with him the patient urinated more than usual. Thereupon the Margrave requested this younger physician not to say anything about this occurrence to his elder colleague, Dr. Troxelle, because he would be vexed that the Prince had urinated more for the one doctor than for the other.

The most famous physicians of Germany and France were consulted, and in addition to Strack, Doctors Ehrmann and Böhm of Strassburg, as well as Dr. Cohausen of Koblenz and Dr. Glückherr of Baden were summoned. Although Cohausen was already over eighty, he was still in full possession of his mental faculties and remembered everything that he had ever read, or had observed himself. Ehrmann[12] was the leading practitioner of Strassburg. These two old doctors, as well as Strack of Mainz, honored me with their friendship, and often conversed with me for hours on scientific subjects. As much as I could, I took advantage of the society of such experienced men. We dined together daily, and one day we also were on the verge of dying together had I not prevented the misfortune in time. We were served a silver plate full of the finest trout. They were in a grass green sauce, which some of us believed was colored by chervil, and others by some other fresh vegetable. I recalled, however, that these fish had been boiled in vinegar the previous evening, and having lain on this plate all night were probably saturated with verdigris. Upon closer investigation my presentiment was completely confirmed, and the highly esteemed gentlemen had to forego a fine dish. On one occasion I found myself alone with the sick Prince. He commanded me to tell him honestly and conscientiously whether there was still any hope for his recovery. Knowing his manly character, I had no scruple in admitting that there was no longer any hope, and that his end was close at hand. Thankfully he pressed my hand. "Il le faut une fois," he said, and from this moment on he seemed to face his fate with equanimity. A few weeks later, on October 21, 1771, the sick Prince died.[13] With tears in my eyes, I autopsied his body, and found an almost complete ossification of the aorta and its main branches up to their division into the femoral arteries. I reported this to the famous Tissot, whom I was to succeed fifteen years later at Pavia. I wrote to him that not only

[12] Johann Christian Ehrmann (1710-1797). Since 1749 he had been a physician to the workhouse at Strassburg.

[13] With the extinction of the Baden-Baden line, the Margraviate of Baden-Baden was inherited by the Baden-Durlach line residing at Karlsruhe.

the brother of the Prince, who was 54 years old, but also his heir, who was only nine years old, had suffered from a similar ossification of the large vessels. I was more than a little surprised to read in Tissot's reply that if the Margrave had been correctly treated from the beginning, he would have been able to live for a long time with this ossification.

On December 23, 1771, my wife gave birth to Joseph, my eldest son.

On April 1, 1772 all the employees and servants of the deceased Margrave, with the exception of four or five officials, were pensioned off. I retained the status of a Court Physician and received an annual pension of 75 gulden. After a short time I received another appointment, this time as Inspector of Midwives in a section of Baden. This position I could not have kept very long, while simultaneously carrying on a medical practice. However, on his return to Koblenz, the old Privy Councillor and Physician-in-ordinary Cohausen had recommended me warmly to the Prince-Bishop of Speyer, Count of Limburg Styrum, whom he had known for a long time. As a result I was soon offered a position as municipal and district medical officer at Bruchsal with a salary of 400 florins and the status of Court Councillor. I accepted this call, and left my native land, to which I would so gladly have devoted my life.

In Bruchsal it was my duty to attend gratis the garrison hospital, an asylum for infirm old people at Altenbürg, a half hour's distance from the city, the large pentitentiary, the prisons and all the sick poor. In addition the medical district outside the city included 36 localities. I was happy to have a position that offered me so much opportunity for the exercise of my profession, and which long before had also been filled by my unforgettable teacher, Professor Gattenhof. I had been at Bruchsal hardly a year and a half when I received an offer, in private, of a post as district medical officer at Bretten in the Palatinate, and as physician in the nearby spa at Zeisenhausen with a salary of 800 florins. The Prince of Speyer learned of this negotiation which was so advantageous for me, wrote to the Elector of the Palatinate to interrupt it, and increased my salary by 200 florins annually. A few months later, Dr. Brodbeck, Privy Councillor and First Physician-in-ordinary to the Prince of Speyer, a very skilled man, left his position, and the Prince-Bishop offered it to me. As I had now reached a point where I could best increase and improve my knowledge by daily experience at the bedside, I told the Prince that I could not accept this position unless I were permitted also to continue to

serve the local public. He agreed to this, and I now received a salary of 800 florins as well as free lodging, free board, 264 bushels of grain, and two tuns of wine. Simultaneously I also became physician to the local saltworks.

On January 6, 1774 my second son, Franz, was born. When the Prince-Bishop had appointed me his personal physician, he had left me to determine my successor in the position at Bruchsal, so my friend Dr. Bierenstiel obtained this post.

As the principality of Speyer had only one trained midwife at Bruchsal, the Prince-Bishop was much concerned about improving the state of midwifery in the entire country. To this end I drafted a plan, and as teacher of midwifery carried it out for more than nine years with the happiest results. Prior to the establishment of this school, and even during the first years of its existence one woman out of every 85 who were pregnant died in labor, or lying-in; after most of the midwives had been trained only one out of 125 died.

Not even a year had passed since I had become physician to the Prince, when he revealed to me that for several months already he had been afflicted with a hydrops of the tunica vaginalis of one testicle, or with what is incorrectly known as a hydrocele. As I expressed no hope for the cure of this condition with internal remedies, and did not wish to propose a so-called radical cure because of the extreme irritability of the Prince who was sickly anyway, advising instead that the fluid be tapped simply as a palliative measure, the patient against my advice wanted to submit to surgery. I requested a consultation with well-known physicians. They approved the operation, which was performed soon thereafter by the Palatine Surgeon-in-ordinary Winter. As the otherwise healthy testicle was covered with small vesicles, the patient, despite my open protests, ordered that it be removed, and the surgeon had to obey. Recovery was accompanied by serious complications. Hardly had the patient begun to recuperate when there appeared on the closed scar a secretion of watery matter, whereupon the Prince's strength visibly increased. Nevertheless he wanted to have this secretion suppressed, and as I did not wish to do this, because I knew that the Prince had formerly been much afflicted with herpes, and always suffered greatly with nerve ailments upon the disappearance of this condition, he employed a miserable village barber who stopped the secretion in a few days by means of astringents. This

was soon followed by an inflammation of the liver, and when I had cured this, the patient, who had recently exposed himself to various causes of disease, suffered a very frightening mental derangement. In one attack he was about to throw himself out of a high window when I pulled him back, thus endangering my own life. After several occurrences of this kind, the cathedral chapter at Speyer felt it necessary to send a deputation to Bruchsal to request a statement from me on the condition of the Prince-Bishop. In my statement I said that the patient was mentally deranged, but that this was a consequence of preceding diseases and disorders in his mode of life rather than a primary mania and, I flattered myself, could be cured. After several months had elapsed, the successful outcome showed that my prognosis regarding this illness, which finally disappeared completely, had been based on good reasons. I was now appointed Princely Privy Councillor, and my salary was raised by 200 florins.

Soon thereafter the Prince-Bishop founded a small hospital in Bruchsal, and placed it under the direction of the Brothers of Mercy. I was made medical director of this hospital, as well as of a similar one at Deidesheim on the left bank of the Rhine, and received an increase of 200 gulden. Later I was appointed a member of a Princely Commission set up to advance the interests of pious foundations.

As a well-equipped hospital was present at Bruchsal, to which was attached an excellent surgeon in the person of B. Joachim Wrabecz, I took advantage of this circumstance to propose to the Prince that anatomical and surgical lectures be given in this hospital for the benefit of the surgeons. My plan was approved, and Wrabecz took over this task with the best results. I participated myself, trained the students in the art of dissection, and together with the aforementioned teachers laid the foundation for a pathological museum at Bruchsal. As lectures on physiology seemed to promise considerable benefits for our young surgeons, I held these daily at a specified time for more than seven years. During the summer, I went with my auditors once or twice almost every week to botanize in the neighborhood. Finally, the Prince-Bishop gave me a garden in which I raised plants employed for medicinal purposes as well as others, and for three years I instructed young surgeons in the principles of botany.

Since coming to Bruchsal, I had made diligent use of the not inconsiderable library that had been purchased by Cardinal Prince von Hutten from the famous Pistorius in Würzburg, and which was now

kept in the Seminary. Although very few or no medical works were present in this library, yet in the many classical works and in other works concerned chiefly with history and legislation, especially in an excellent collection of polemic treatises on various subjects, I found a veritable treasure for my Medical Police. Such free time as remained from my very extensive practice and my studies, I spent in the company of my good sister (Maria Magdalena Frank, wife of the Princely Governmental-Secretary Lippert), and of my two unforgettable friends, the present Privy Councillor Oehl, and Court Councillor Niesen (author of Algebra for the Seeing and the Blind), whom death has since taken from me, and his excellent wife.

In 1776, I had the following little book printed anonymously by Schwan at Mannheim:

1. *Sendschreiben eines Rheinischen Arztes über einige von dem Kollegium der Aerzte zu Münster aufgestellte Grundsätze.*

Soon thereafter, I followed this with another written in Latin, namely:

2. *Joannis Petri Frank,* M.D. Consiliarii Aulici ac Archiatri Spirensis, *Epistola invitatoria ad Eruditos, de communicandis, quae ad Politiam medicam spectant, Principum ac Legislatorum Decretis.* Mannhemii apud Schwan. 1776. 8vo.

After the appearance of this publication, I read a review of it in a learned journal. The reviewer praised the plan that I had announced for my Medical Police, but he doubted whether the author would be equal to the task, especially as he lived in Bruchsal, and had no access to a public library like that at Göttingen. In time this objection was also to be removed. On the whole, I received few contributions from foreign physicians. Court Councillor Gruner of Jena and Professor Platz of Leipzig sent me important works.

Epidemics prevailing among cattle, and soon thereafter among horses, gave me occasion to carry out several pathological dissections on these animals. The prejudice against this, however, may be seen from the following circumstance. A white mare had died while foaling, and was to be buried in a nearby wood by the knacker. When I wanted to dissect the animal and asked for a larger knife from the knacker, he requested me with the best of intentions "not to damage my honor in this way!" A similar prejudice would almost have ruined the only trained midwife in Bruchsal. Out of pity for a poor family, she had agreed to

save their only possession, a cow that was unable to give birth to her calf, by delivering the animal. As soon as this occurrence became known in the city, almost no woman wanted to employ this midwife. I induced the Prince to give her a reward for her good deed.

In 1779 I issued the first volume of the following work:

3. Johann Peter Frank, M.D. Privy Councillor and Personal Physician to His Highness the Prince of Speyer. *System einer vollständigen medizinischen Polizey.* I. Band. Mannheim at Schwan's. 1779. 8vo.

As this work had no small influence on my fate, I do not feel it necessary to hold back certain circumstances that relate to it. When the manuscript of this first volume was completed, I requested the Prince-Bishop of Speyer, who had no high opinion of learned works, to appoint someone to censor it for me. He chose the Clerical Privy Councillor Schmidt, General Vicar of the Bishopric of Speyer (at present suffragan bishop), a very learned, excellent man, who for many years while still a Jesuit, taught Canon Law at Heidelberg. After carefully reading my manuscript, he certified in writing "that it contains nothing contrary to morality, religion or the political order." At the same time this worldly-wise man predicted many of the effects that my work would produce, but these were unable to frighten me. I now gave my manuscript to the press. Hardly had the last page been printed, when a learned journal at Frankfurt announced it in such a way that I knew very well the reviewer had read only the running heads of my book. Immediately a hullabaloo developed. The publisher wrote to me that by all indications the work would be prohibited as soon as it appeared, and that in certain places it was being subjected to careful official scrutiny. I knew of no crime that I had committed; I was covered by the censor's opinion; and therefore awaited the outcome calmly. A year elapsed before I became aware that this book had made a favorable impression on someone other than its author. At that time, however, the Prince-Bishop reproached me in such fashion that I was led to request my release from the service of Speyer. This was not granted. I learned that the criticism stemmed from a foreign source. The Bishop, whose life I had saved three times, assured me of his satisfaction with me, and I remained in my post, on the condition that I would be able to continue my work.

The first edition was exhausted within the year of publication, and as I had not found anything essential that had to be changed or added,

this volume was provided with a second preface and simply reprinted.

In the meantime I sent a small article to Dr. Joh. Christian Ferd. Scherf's *Archiv der medizinischen Polizey und der gemeinnützigen Arzneykunde.* It was entitled:

4. *Etwas über die Zwistigkeiten der Aerzte und ihre Ursachen.* This paper was published in the first volume (p. 133) of that useful publication. The same volume (p. 151) also contains:

5. *Das Hochfürstlich Speyersche Mandat zur Verhütung der Hundswuth,* Bruchsal, 1779. (I was the author of the medical section.)

A short description of an animal monster that I wrote is to be found in Reinhard's *Medizinisches Wochenblatt für Aerzte, Wundärzte, und Apotheker,* Volume 1, 1780, p. 221.

In 1780 I published:

6. *System der medizinischen Polizey,* II. Band. Mannheim, 1780. 8vo.

The widow of the reigning Margrave of Baden-Baden, née Duchess von Aremberg, resided in Baden. During a visit which she made to the Prince-Bishop of Speyer to attend to various matters, she requested him to permit me to attend her in a professional capacity, and whenever she was seriously ill to visit her as often as I believed to be necessary and the health of the Prince would permit it. As the distance from Baden was no more than six miles, and the Bishop (who had another personal physician, Dr. Roussi) wanted to oblige this Princess, he not only permitted me to take a position as her personal physician, but even commanded me in her presence to respond to her every beck and call. Hardly had the Princess departed, when the Bishop reproached me bitterly for having assumed this obligation. I assured him that I had accepted this position only at his command, and was also ready at his command to repudiate it. Furthermore, I assured him that in case he himself should fall ill, I would never leave him for anyone else. The Bishop forbade me to mention this occurrence to the Margravine. A half year later the Princess wrote to me, and requested my attendance. The Bishop was in good health, and I asked him whether I should accede to this request or refuse it. He told me to obey. I promised to be with him again in three days. Just as I was about to depart, the Prince sent his confidant to inform me that I could attend the Margravine this one time, but not thereafter and for this he would promise me an annual increase of 300 florins. I replied

that I did not want it to look as if I was exchanging this gracious lady (who, besides being my former sovereign, had always treated me very kindly when I was her court physician) for this sum of money. Nevertheless, I was ready, without this raise, to explain to the Princess that the Bishop required my services at every moment so that I would no longer be able to leave him. Again I was forbidden to say anything about the Bishop's change of mind.

After my return the Prince-Bishop demanded most urgently from me a written statement "whether I would serve him alone as personal physician for life, and in return would accept the proposed salary increase?" I replied that I would obligate myself even without the money, if the Bishop for his part would likewise assure me in writing of the continuance of the conditions that he had promised me for years, particularly, however (since I had come to know him as a man of impetuous and vehement temperament), treatment appropriate to my services already performed and those yet to come. After informing the Margravine of my situation, and receiving her acquiescence, without which I would never have done anything, these written agreements were exchanged.

Hardly half a year had passed, when the Prince, despite all the trust placed in me, let me feel that I was not free. The remonstrances that had been occasioned by the first volume of my Medical Police began again and became intolerable. I declared that I regarded as broken the promises which had been made me, and consequently felt free to disregard my agreement. In the meantime, the Prince-Bishop attempted repeatedly to settle this dispute and so for several years I postponed the execution of my decision.

About this time I took over the scientific education of Louis Frank, a son of my brother Martin who lived in Bitsch. This boy, who was already eighteen years of age, had not been educated to become a scholar, and I had been asked simply to take care of him in such fashion as was possible for me. As I had no conception of how this might be done, and on the other hand noticed that he had ability, I resolved to see that he made up for lost time in everything that was necessary for the training of a competent surgeon. As long as I remained in Bruchsal, Louis attended all my lectures. As soon as it was at all possible I brought him to the bedside, and soon convinced myself that the education of young physicians is rendered infinitely more difficult by the circumstance that they are

brought so late to this fruitful source of knowledge, and for several years are occupied simply with better or poorer copies of nature. In a few years the young man had himself seen everything, regarding which, according to the old arrangement, I would first have had to teach him the correct principles. His progress, surpassing my expectations, now led me to expand the plan that I had used for him; and when I was later employed at the Universities of Göttingen and Pavia, I took advantage of so fortunate an opportunity, and had the pleasure to train Louis in about eight or nine years to be a skilled physician and surgeon. By appointing him as assistant physician in the large hospital at Milan, and recommending him to the attention of skilled physicians and surgeons, I now gave him an opportunity to increase his practical knowledge. At the same time he was appointed personal physician to Prince von Khevenhüller who lived in Milan, so that he did not have to concern himself with anything but professional improvement. During his stay in Milan, Louis, together with several skilled physicians and surgeons, wrote the *Nuovo giornale della piu recente letteratura medico-chirurgica d'Europa,* which was favorably received. My departure from Pavia left my nephew alone in a country, which he was soon to leave with his Prince, before the entry of the French Army. He stayed with him for about two years in Florence, where he wrote the *Biblioteca Browniana.* After that he wanted to be appointed as chief physician in the General Hospital (*Allgemeines Krankenhaus*) at Vienna. In accordance with my principles, however, I advised him to drop this aim. Soon thereafter, Louis decided to visit distant and very torrid regions in order to observe the diseases in these areas. Without awaiting my opinion on this strange decision, he sailed for Egypt. After spending hardly eight months in the country, and getting as far as Upper Egypt, the French troops occupied the country. Presumably because he was now endangered by the natives, he returned to Cairo, and joined the French Army as a physician. He remained with the French, as I learned, until shortly before the surrender of Alexandria, and presumably will now have returned with his compatriots, as a prisoner, to France.

Meanwhile, I had been admitted as a member to the Academy of Sciences of the Electorate of Mainz at Erfurt, and in 1783 I communicated the following to it as a contribution to its publications of general utility:

7. *Observationes medico-chyrurgicae.* Observ. I. de singulari abscessu

hepatico. Observ. II. de sectione symphysis ossium pubis in Episcopatu Spirensi peracta. Observ. III. de paracenthesi in ascitica muliere gravida suscepta.

In the same year there appeared from my pen:

8. *System einer vollständigen medizinischen Polizey.* III. Band. Mannheim. 1783.

Meanwhile my wife had given birth to a number of other children. However, as several were born dead, and others died during the first few years after birth, I pass over them without any further mention. In this year and in several preceding years, I had various domestic troubles. The education of my children was my responsibility alone, and as I frequently had to accompany the court into the country, this obligation, which I considered so sacred, was often rendered difficult for me. One day a man of quality asked why I did not send my two sons to the educational establishment at Stuttgart which was then in high repute. I replied that in the first place I did not feel like leaving to others the execution of my duties, and secondly that where there were many boys together it seemed to me that it would be more difficult to train them. To the unexpected question, Why? I replied that large educational establishments very easily fell prey to an endemic malady which even with the greatest caution could hardly be prevented; that I knew nothing that would not redound to the fame of the Stuttgart institutions, but that I, perhaps because of an exaggerated fear, preferred to educate my children myself. The gentleman to whom I spoke so candidly was profoundly affected by my remarks. His sister, wife of Oberstallmeister v.M. at M. had sent her only son to the aforementioned educational establishement. He immediately wrote to her and gave her, I know not how, an account of his conversation with me which disquieted this tender mother very much. She wrote immediately to her friend, Freiherr v.T. at Bruchsal asking him to urge me to proceed without losing any time to Stuttgart, to observe her son in my capacity as a physician, and if I felt it necessary to send him home. Because he himself had two sons in this institution, this friend sent the letter from the lady to the director of the school. The latter felt that he had to transmit this communication to the reigning Duke of Würtemberg, the founder of this academy. The Duke, who had accomplished such an infinite amount of good in this capacity, found himself extremely insulted simply by the suspicion that appeared to underly this letter. I was soon

informed of this occurrence which mortified me, and felt that I owed the benevolent Prince a written account, in which I related the true circumstances of this affair, assured him of my innocence, and expressed my respect for his institute. The Duke was very satisfied with this candid statement; and immediately communicated to me his assurance on this point. In July 1783 the Prince-Bishop of Speyer visited the Duke. When I was presented to him, he said very kindly that he had read my writings, and held their author in esteem. Now, for a scientist this was a very trite compliment. The Bishop, who did not hold the same opinion of the Medical Police replied that he thought more of compendia than of detailed systems. The Duke replied very appropriately, I thought, "that it was somewhat easier to prepare compendia from such a system." Then the Duke led his guest, because he was a lover of horses, first to his stables, then to the school.

The number of pupils was very large. The organization of the institution appeared to me incapable of improvement, and the students for the most part presented an appearance that led me to draw very favorable conclusions as to their moral training. The Duke took me aside and urged me to admit honestly whether I still had the slightest doubt on the subject in question. I congratulated the Duke on the healthy appearance of his pupils, but admitted to him that I was not yet entirely satisfied, at least with regard to the future. The good Prince mentioned all the precautionary measures that he had employed to prevent every evil, and even led me to the school toilets. The doors and the walls were of glass. No boy could go there without being observed by one of the inspectors. "Are you satisfied now?" asked the Duke. It seemed to him that I was suppressing an idea, which he wanted to know. I replied that I had just thought of a quotation from Juvenal: "Pone ferram! pone custodes! sed quis custodiet ipsos custodes?" This, said the Duke, is really carrying things too far!

In the evening the Prince-Bishop asked me whether I intended to fall in with the hints expressed by the Duke and to visit one of the lectures for the students; and if so, which one did I intend to select? I promised to visit one of the lectures on forensic medicine and medical police. My decision was reported to the Duke. The following day, when I entered the lecture hall, the learned professor descended from his platform, and urged me to continue his lecture. It was not appropriate, he told me very

obligingly, to want to teach a science in the presence of its founder. I refused to accept such an honor, but the teacher and the students urged me so insistently that I realized it was the Duke's wish that I accept the invitation. I inquired, therefore, what was being discussed today? Infanticide was the reply, and the teacher pointed out the place in his lecture book where he had stopped. Finally, I sat down among the students and spoke for a quarter hour on this subject. My willingness weighed the balance in my favor.

The next day the Duke showed his guest the princely library, which he had considerably enlarged, and here again he found an opportunity to show me how he protected and cultivated the sciences. Personally he climbed up, took the *Medicinische Polizey* from its shelf, and showed it to the Prince-Bishop, repeating again publicly the approval with which he regarded this work. Later the Duke received the Prince-Bishop at Hohenheim. I can hardly describe the splendors of this region. As I turned my attention to a large plot, on which were raised all the flowers and shrubs that grow wild in the Duchy of Würtemberg, the Duke pointed out his gamekeepers who, at his command, had received a good training in botany, and had collected all the native plants that were gathered here, and requested me to test one of these people at random. I grasped the first wild flower that bloomed at my feet, and the gamekeeper summoned by the Duke dissected it on the spot, determining its character, according to the Linnaean system, with considerable skill. I now followed the Duke to an artificial meadow. Pointing to a delicate bust he said: "Here I have erected a small monument to my unforgettable friend, Albrecht Haller." The inscription was similar to this remark.

(*To be concluded*)

Sensualism and Vitalism in Bichat's "Anatomie Générale"

PEDRO LAIN ENTRALGO*

A Mind in its World

Every living being requires for its constitution a vital environment, a medium. The philosopher Zubiri has suggested keeping the name "ambient" (from *ambire,* "to go from one place to another") to designate the animal medium, and "world" to designate the human. We shall follow this happy appositeness of name to concept, and observe that the constitution of all human existence involves, necessarily and essentially, a world diversified into things, living beings, persons, and human works, institutions and forms of life. In adolescence we awake to personal life within a world, and—what is more serious—with this world interpenetrating ourselves as the very stuff of our souls. In this world we define ourselves as individual persons by accepting part of what it offers us and laying part aside, by doing something either original or imitative, and by implicitly or explicitly dreaming of all we want to do but cannot.

Bichat built up his own personality in the intellectual and political world of the Paris of the Revolution. One century and one historical epoch were at an end; another century and another epoch were beginning. But this new epoch may not have been so final as it was felt to be in 1789 by the deputy in the Constituent Assembly who cried, "We want to make a declaration for all men, for all time, for all countries, and to serve as an example for all the world!" What, in the spiritual world in which he found himself at the outset of his personal life, did the youthful Bichat accept? What did he reject?

Bichat himself gives us part of the answer. He says, in effect, in the preface to the first edition of his *Recherches physiologiques sur la vie et la mort*: "In the present state of physiology, the art of allying the experimental methods of Haller and Spallanzani to the general and philo-

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sophical concepts of Bordeu should, in my opinion, be cultivated by all judicious minds." At the beginning of his *Traité des membranes* he writes: "It has been by reading his work [Pinel's *Nosographie philosophique*] that the idea of this book presented itself to me." Elsewhere he eulogizes and accepts the severe anatomical method of Desault. In the *Anatomie générale* he affirms, finally, his intention of building up the "physiological sciences" on the new model of physics, chemistry, and astronomy.

I will endeavor to discern the elementary ingredients of which this mass of influences, thus expressly accepted by Bichat, is composed. From his master Desault he took the anatomical method, the desire not to admit that anything in medicine is real which is not capable of being demonstrated *de visu* from the autopsy of the cadaver; from Bordeu, the vitalist doctrine; from Pinel, the method of sensualism (*la méthode de l'analyse appliquée à la médicine*) and the idea of an analytical anatomy; from Haller and Spallanzani, the experimental method; from the science of his day (Lalande, Lagrange, Lavoisier, Laplace), scientifico-natural thought. The expression can be still further narrowed down: Bichat constructed his personal work by accepting from the world into which he was born three components that have been already worked out: sensualism, vitalism, and the scientifico-natural thought. Let us consider them one at a time.

1. *Sensualism.* The philosopher John Locke (1632-1704) gave a strictly empiricist turn to the old doctrine of the *tabula rasa,* and affirmed, in contradistinction to the Cartesian innatism, that man's knowledge has no source other than experience. This experience may be both external, or sensation, and internal, or reflection: it is through sensation that we receive "ideas" of external objects (Locke described anything contained in consciousness as an "idea"); it is by means of reflection that we turn into "ideas" our mental states (believing, doubting, wanting, deciding, and so on). Ideas reach our mind through sensation or through reflection, and may be simple or complex: simple ideas are irreducible (e.g., whiteness, space, pleasure, unity); complex ideas arise out of the composition or association of simple ideas.

It is these assumptions concerning human cognition that determine the working out of a method by which we may know scientifically and increase the sum of what we know. "We must therefore, if we will proceed as reason advises," says Locke, "adapt our methods of inquiry to

the nature of the ideas we examine." Locke unflinchingly sets before us the example of the mathematicians:

> By what steps we are to proceed in these [the finding of general propositions], is to be learned in the schools of the mathematicians, who from very plain and easy beginnings, by gentle degrees, and a continued chain of reasonings, proceed to the discovery and demonstration of truths, that appear at first sight beyond human capacity . . . [1] [Here are the two fundamental rules of the method he sets before us] to enlarge our knowledge, as far as we are capable:
>
> I. The first is to get and settle in our minds determined ideas of those things, whereof we have general or specific names; at least so many of them as we would consider and improve our knowledge in, or reason about . . .
>
> II. Secondly, the other is the art of finding out those intermediate ideas, which may show us the agreement or repugnancy of other ideas, which cannot be immediately compared.[2]

Resolution of ideas into their simple elements, association and direct or indirect comparison are, in short, the component parts of the intellectual method Locke sets before men of science.

More radical, and for that reason more attractive to observers of nature, was the Abbé de Condillac (1714-1780). Condillac saw in external experience or sensation the sole source of human cognition. The material afforded by internal experience may in the last resort be reduced to mere sensation: a statue endowed with a single external sense—smell, for example—would be capable of observing, remembering and distinguishing, and consequently of judging.

The extreme sensualism of Condillac concerning the origin of human knowledge conditions his conception of scientific method. Condillac thinks that there exists one optimal method, common to all human knowledge: "A method which has led to one truth," he says, "may lead to another, and what is the best method must be the same for all sciences. It will be enough then to reflect upon the discoveries that have been made in order to learn how to make fresh ones." And as the simplest discoveries are those of mathematics, it is to the example of these that Condillac also has recourse: "I will take as an example," he says, "the elementary notions of mathematics and I shall suppose that we are in the position of acquiring them for the first time."

Here, literally transcribed, is the convenient methodology of the sensualistic abbé:

[1] *Essay concerning human understanding*, IV, XII, §7.

[2] *Ibid*, IV, XII, §14.

> We should undoubtedly begin by putting to ourselves the idea of unity; and, by adding it to itself repeatedly, we should form aggregates of units, which we should represent by signs. We should repeat this operation, and by these means we would soon possess as many complex ideas of number as we might desire. Next, we should reflect upon the mode in which these ideas have been formed; we should observe the sequence, and we should infallibly learn the means of resolving them again. This done, we would be able to compare the most simple with the most complex, and to discover the properties of either. By proceeding thus, the operations of our minds would have no object but simple ideas or complex ideas composed by ourselves, with whose generation we should therefore be perfectly acquainted . . . [This is the optimal method and should be the universal one: the remaining sciences] have no other principles than the simple ideas which reach us through sensation and reflection. In order to arrive at complex notions, as has occurred in mathematics, we have no means other than that of uniting simple ideas in various aggregates. The same order must, then, be followed in the advance of ideas, and the same precautions must be taken in the choice of signs.[3]

In short, the intellectual method which Condillac proposes for scientists consists in the following rules: 1. Analysis of our immediate experience, to the point of reducing it to an aggregate of "simple ideas"; these, for an out-and-out sensualist, cannot but be elementary sensations. 2. Establishment of an audible and visual "sign" whereby each and all of these simple ideas may be accurately named. 3. Artificial composition of unitary aggregates by interconnecting simple ideas in diverse modes, and thus obtaining fresh complex ideas (progress in sciences) and abstract ideas or general propositions. 4. Study of the generation of complex ideas acquired by immediate contact with reality, with the object of refining them. "Complex ideas," says Condillac, "are the work of our mind: if they are faulty, it is because we have made them badly; the sole method of correcting them is to remake them. It is necessary, then, to take the materials of our knowledge again and rebuild them as if they had never been used before."

These precepts can be subsumed into analysis and association. With great clearness and force this Moses of sensualism proclaims as much: "I have said that analysis is the sole key to discoveries. But, the reader will ask, what is the key to analysis? Association of ideas."

My present undertaking does not consist in critical dissection of the scientific method of sensualism. Having once expounded it, I must confine myself to pointing out its immediate and vigorous influence on the minds of many French physicians. "When Condillac died," wrote Raymond Lenoir, the recent editor of the *Essai sur l'origine des connaissances*

[3] *Essai sur l'origine des connaissances humaines,* Deuxième Partie, II, §3.

humaines, "he left to the savants a method and to the ideologists a doctrine." Among the first were Barthez and Pinel, who undertook the vain enterprise of constructing a "truly scientific" pathology upon the methodological principles of sensualism. "How could the physician afford to ignore the history of the human understanding, which has been traced with such depth and precision by Locke and Condillac?" says Pinel at the beginning of his *Nosographie philosophique.*

It was from this *Nosographie philosophique* that Bichat and Laënnec learned the principles of the *méthode de l'analyse.* More cautious, or, to be precise, more talented than Barthez and Pinel, Bichat does not apply the elementary analysis to scientific knowledge of the *living reaction* of which the disease consists, but to the study of the *static texture* of the animal body. Hence the good fortune of his great discovery: the notion of "tissue." Laënnec, for his part, confined himself to employing the method for analysis and classification of the *physical signs* in which the anatomo-pathological lesion in a diseased organism displays itself to the senses of the physician.

We shall see how Bichat personally worked out and rendered fruitful this decisive component of his intellectual world. At present I have merely sought to define it and note its appearance in the great anatomist's mind.

2. *Vitalism.* When Bichat speaks of Bordeu's general and philosophical conclusions, he is obviously referring to the vitalism of Montpellier. In Montpellier's vitalism lies the most immediate predecessor of Bichat's vitalism; in Stahl's animism, its intermediate predecessor; and in the pan-vitalism of the Nordic Renaissance (Paracelsus, van Helmont), its distant source.

It is not difficult to perceive the gradual reduction undergone by the scope of "life" in the course of this historical process. "Everything in nature is alive; the whole macrocosm is one gigantic living being," is the teaching of Paracelsus and van Helmont. "Only certain beings, namely those endowed with *anima,* are alive; in so far as no *anima* is at work upon a material system, the latter is governed by mechanical forces and putrefaction sets in," asserts Stahl; and, together with him, Sauvages (1706-1767), who with great conviction professes Stahl's doctrine and spreads it into Montpellier's Hippocratic stronghold. It is, in fine, from Sauvage's animism that the famous "vital principle" thesis—to use the title finally given to it by Barthez—derives.

Vitalism is a typically defensive and conservative, nay, a stupidly

conservative, doctrine. When in the seventeenth and eighteenth centuries we seem to be witnessing the triumph (historically speaking, at any rate) of the revolutionary mechanistic thesis, which even reached the idea, in La Mettrie, of an *homme machine,* these conservatives of biological thought, instead of bringing a deep understanding and a fresh mind to the ancient lesson of Aristotle, preferred to invent the expedient of a "vital principle" interpreted as a "specific force." According to the vitalists, the activity of a living being must be the result of a "force" specifically distinct from the mechanical forces (gravitation, heat, affinity, and the like), and hence not reducible to them, *but situated, qua force, on the same plane of reality.* The idea of interpreting the vital "principle" as a "force" and not as a "form" in the Aristotelian sense is the unpardonable metaphysical error of vitalist conservatism and the reason for its extreme dialectical weakness as against the experimental case presented by the laboratory men.

Montpellier's vitalist doctrine reached Bichat through Bordeu (1722-1776) and Barthez (1734-1806). His mind accepted it, but not without stamping some very important modifications upon their legacy; Bichat's personal work upon vitalism may be left to a later stage.

3. *The scientifico-natural method.* Despite his acceptance of vitalism, Bichat does not admit any *modus operandi* but that of natural science: nothing but reliance on observation, experiment, and causal reasoning, as understood by physicists. As he tells us in his *Recherches physiologiques sur la vie et la mort,* he sought to unite Bordeu's philosophical conceptions with the "experimental method of Haller and Spallanzani."

The dazzling results obtained by natural science in the eighteenth century fascinate Bichat. Newton, he tells us, "was the first to learn the secret of the Creator, namely, the simplicity of causes allied to the multiplicity of effects."[4] He constantly appeals to the example of astronomy and chemistry and the various branches of physics, and seeks to understand biology and medicine after the same mode in which all of these understand the relationship between cause and effect:

> The relationship between properties as causes, and phenomena as effects, is an axiom whose repetition has today become almost irritatingly familiar in physics, chemistry, astronomy, and so forth. If this work establishes an analogous axiom in physiological science, it will have achieved its object . . . Physical science, equally

[4] *Anatomie générale,* Introd., §1.

with physiological, is found to be composed of two things: first, the study of phenomena, which are the effects, and secondly, examination of the connexions subsisting between these and physical or vital properties, which are the causes.[5]

It is not hard to discern Bichat's aim and his manner of accepting the current thought of natural science. Through a systematic use of sensory observation and of experiment, Bichat seeks to build up a physiology that will be something like a physics of "vital properties." What mechanics does for the physical properties we call gravitation and elasticity, physiology should do, *mutatis mutandis,* for the vital properties called sensitivity and contractility:

The digestion, the circulation, the sensations, do not suggest to the physiologist's mind the idea of sensitivity or contractility in the way that the movement of a watch reminds the mechanic that elasticity is the motive power of this movement, or in the way that the wheel of a mill or any water-operated machine reminds the physicist of gravitation; and in order to equate these two types of science in this respect, it is clearly necessary to conceive an exact idea of vital properties, whose influence, if its bounds are not scrupulously demarcated, cannot be analyzed with certainty.[6]

This paragraph is thoroughly expressive of Bichat's attitude. What he shows us, in fact, side by side with his resolute fidelity to the causal reasoning of the sciences of nature, is his firm vitalist convictions (in so far as "vital properties" are specifically distinct from "physical properties" and irreducible thereto) and his idea, also a vitalist one, that vital properties, being the "forces" they are, are to be found on one and the same ontological plane as physical properties (in so far as a well-determined "boundary" admits of being traced between the one group and the other).

I have said, however, that for Bichat this parallel between physics and physiology must be understood *mutatis mutandis.* According to our physiologist, mathematics, so valid for the ascertaining of physical laws, cannot be employed to express the "laws" of life.

The invariability of the laws governing physical phenomena permits all sciences dealing with these to be subjected to calculation, whereas the application of mathematics to the actions of life can never furnish general formulae. One can calculate the return of a comet, the resistances of a fluid passing through an inert conduit, the velocity of a projectile, and so on; but to calculate as Borelli does the power of a muscle, or as Keil does the velocity of the blood, or as Jurine, Lavoisier, and others

[5] *Ibid.*
[6] *Ibid.*

do the quantity of air that enters a lung, is to build on sand a structure solid enough in itself but destined soon to collapse for want of a firm foundation.[7]

Physics (the science of "physical properties"), vegetable physiology (the science of "organic vital properties"), and animal physiology (the science of "animal vital properties") are, then, for Bichat three natural sciences; but the three of them constitute so many intellectual domains, separate from one another *in point of method,* despite their contiguity, as the specific properties of the beings that each of them studies are separate from one another *in point of reality.*

The method of sensualism, the doctrine of vitalism, and the governing principles of the scientifico-natural mentality (sensorial observation, experiment, mode of understanding causality) are the three ingredients of an intellectual order which the mind of the youthful Bichat adopted from the world he lived in. In addition there was his personal experience of life in the French Revolution, at the outbreak of which he was present and in the midst of which he lived. Let us now try to see how his mind managed to combine all these borrowed materials into a work of his own. I shall confine my treatment to his definition of life and to the problem of what he calls "general anatomy."

IDEA OF LIFE

The passage in which Bichat expressed this idea is now a *locus classicus*: "It is customary to seek the definition of life in abstract considerations; it will be found, I believe, in the following general notion: *Life is the sum total of those functions which resist death.*"[8]

Such are the words which everyone knows by heart. However, to give them their full scope, it is essential to place them in their context. Bichat continues:

> Such actually is the mode of existence of living bodies, which tend to be destroyed by all that surrounds them. They are worked upon unceasingly by inorganic bodies; they exercise a continual action upon one another themselves; they would soon succumb, did they not possess within themselves a permanent principle of reaction. This principle is the principle of life . . . The difference, then, that exists between the pressure of the external forces and that of the internal resistance is the measure of life, whose weakness is betrayed by an excess of the first, while its strength is indicated by the predominance of the second.

[7] *Recherches physiologiques sur la vie et la mort,* I, VII, §1. The physiological research of the ensuing decades was destined to nullify this sweeping statement of Bichat's.

[8] *Ibid.* I, 1.

Rather than criticize this definition, which, indeed, has been done already and is far from difficult,[9] let us try to understand it. Its component parts are three fundamental concepts: life is a force distinct from the physical forces and one whose mode of expression is what Bichat calls "the sum total of functions"; this force is manifested in the first instance by a *reaction;* this reaction is defensive, having the sense of a *resistance* to destruction. Vitalism (life as "vital force"), reactivism (life as "reaction") and pessimism (life as "resistance") are, accordingly, the three conceptual elements in Bichat's definition. Let us leave the first aside as it has already been briefly considered, and let us examine the other two more attentively.

The immediate predecessor of the view of life as a reaction is, in my opinion, the physiology of Cullen (1712-1790) and Brown (1735 or 1736-1788). Brown defined life as the specific capability (*incitabilitas*) of responding to exterior and interior stimuli that irritate the living body. Life would thus be a state provoked, nay "forced," by external stimuli: *vitam coactum statum esse,* is literally what Brown says. The Brownian doctrine gained currency on the continent of Europe by three historically and geographically distinct paths; German medical romanticism (the poet Novalis and the philosopher Schelling, each in his own way, would seem to be the inciters of this curious movement and the carriers of Brownism), the "counter-stimulism" of the Italian Rasori, and the vitalism of the Frenchman Bichat. The fragment of the *Recherches* that I have transcribed above represents, in fact, a compromise between the vitalism of Bordeu and the reactivism—also vitalistic—of Brown.

But if Bichat accepted this idea of life as a reaction, he did not fail to invest it with a sombre, pessimistic hue. The vital "action" of which the reaction consists would seem to be a mere "resistance" to the agents

[9] Here, for example, are the terms in which it is criticized, with excellent good sense and a certain Leibnitzian optimism (Panglossian, Voltaire would call it) by Dr. Cerise in the notes to his edition of the *Recherches* (Paris 1866) 275: "We will say, then: 1. The notion of vital force, expressed in these terms, is an inexact notion, since the most general action in life is not a *resistance,* a reaction, an opposition; 2. This force acts upon *external powers,* not so much by setting up a resistance to them as by making them serve the ends for which it was created; 3. If, as the geologists say, the inorganic world has preceded the appearance of organized beings, if this provision has been made so as to furnish them with a medium in the bosom of which to fulfil the functions of life, we must be at pains not to confuse this harmony, so marvellously preestablished, with an antagonism which would be the negation of it; 4. Life is not a state of perpetual struggle against external nature, since it is always in a state of continuous formation in so far as it is ceaselessly absorbing the various elements of the inorganic world by means of regular and specially adapted operations."

surrounding the living being, all of which, according to the text of Bichat, tend to destroy it. To live, in short, is to defend oneself against death, as a beleaguered city defends itself against destruction, or a square of infantry against the squadron of cavalry that charges it.

Two causative movements of force can be distinguished in this defensive pessimism of Bichat's. One is intellectual: this extra-mechanical force in which the life of organic beings consists is something similar to the last defensive redoubt of that all-embracing "Life" of renaissance pan-vitalism. When the vision of the universe passed from the living macrocosm of Paracelsus to the mechanical system of Laplace, an animal or a plant, to the mind of a vitalist of the Enlightenment, became a number of nodes of vital force surrounded by the menace of mechanistic interpretation and offering heroic resistance thereto. Hence the pessimism of the famous definition, which testifies to a very concrete position within the historical line: Paracelsus, Giordano Bruno, and van Helmont; Leibnitz and Stahl; Bordeu and Barthez; Büchner, Moleschott, and Feuerbach.

This is not, however, the only thing which in my opinion determines the biological pessimism of Bichat. Let us recall his personal experience of the Revolution (siege of Lyons, arrest of Desault, months of the Terror) and let us venture to estimate the stamp it may have imprinted upon his mind. On one page of the *Recherches physiologiques* (*I, VI* §2) Bichat recalls the impression produced on his spirit by the year 1793: "a time when every murky passion, fear, gloom, revengefulness, seemed to be hovering over France." Is it strange that the man, for whom remaining alive has involved a temerarious defensive action, should see in living a mere resistance to destruction? I do not think it one whit exaggerated to say that Bichat's definition is the intellectual offspring of a deeply counter-revolutionary personal disposition. All too clearly is this destined to be demonstrated *a posteriori* by the pessimistic satisfaction, if such a phrase is legitimate, with which the same idea is wielded by the defining authorities of counter-revolutionary thought. If not, let us read, for example, the following passage from the Spanish counter-revolutionary Donoso Cortés:

> Man is barely born, and it seems he has come into the world through nothing but the mysterious power of a maleficent conjunction and beneath the weight of an implacable doom. All things lay hands upon him, and he turns violent hands against all things. The first breeze that touches him and the first ray of light that strikes

him, is the first declaration of war by the outside world. All his vital forces rebel against the painful pressure.[10]

Donoso's counter-revolutionary anthropology is thematically built upon the biology, also counter-revolutionary, of Bichat.

To sum up: the historical apogee of mechanism and personal experience of the French Revolution determined the pessimistic complexion of Bichat's vitalism and of his definition, as misunderstood as it is oft-repeated: *la vie est l'ensemble des fonctions qui résistent à la mort.*

Life, thus envisaged by Bichat, adopts in his eyes two modes hierarchically and specifically distinct from each other: one mode common to the vegetable and animal kingdom, which is *organic life*; and another, the peculiar inheritance of the latter, which is *animal life.* "It could be said that the vegetable is the rough sketch or cartoon of the animal, and that in order to form the latter, it was only necessary to equip this cartoon with a set of external organs appropriate for the establishment of relations."[11] The theme of the two modes of life, so fundamental to Bichat's physiology, stands thus inaugurated.

General Anatomy

At the beginning of the *Traité des membranes,* known to be a prelude to the *Anatomie générale,* can be read the following valuable admission: "Citizen Pinel has established . . . an intelligent connection between the different structures and the different affections of the membranes; it was the reading of his work that suggested the idea of this book to my mind."[12] What could the young anatomist have read in Pinel's work that he should have felt himself urged towards so lofty an undertaking?

There are two fruitful notions, one of anatomy, the other of method, which Bichat learned from the pages of the *Nosographie philosophique.* Pinel, who had conceived the idea of classifying internal diseases by the anatomical structure of the parts affected, saw in the phlegmasias the department in which this taxonomic method might show itself most useful:

> The inflammatory state [Pinel said in 1798, two years before Bichat published his *Traité des membranes*] has, in fact, properties in common, whatever the part

[10] *Essay on catholicism, liberalism and socialism* (Madrid, 1851, III, 4). Once this paragraph is read, in which Bichat's direct or indirect influence is so evident, it is hardly surprising that Donoso should declare himself a supporter of "that [philosophical system] articulated in virile fashion by Hobbes, according to which a universal, ceaseless, simultaneous war is the natural and primitive state of man."

[11] Bichat, *Recherches,* I, 1, §1.

[12] *Traité des membranes,* (1st ed.) 4.

attacked may be, and these points of contact are more considerable in proportion to the closeness of the analogy of the tissues and the organic functions of the parts affected; but again, how great is the diversity, if the organization of these parts is different! The phlegmasias have thus been divided into different orders, according as they are found in the integuments, in the mucous membranes, serous or fibrous, in the glands, or in the muscles. What does it matter that the arachnoid membrane, the pleura and the peritoneum are situated in different parts of the human body, if these membranes possess general conformities in their structure?[13]

In accord with his proposal, Pinel collects, under Order II of Class II of his classification, the phlegmasias of all the mucous membranes, whatever may be their situation in the organism, and composes Order III of the phlegmasias of all the serous membranes. Each particular phlegmasia (enteritis, pleurisy, peritonitis, etc.) is represented by a distinct genus within the same Order.

In so doing, Pinel took a decisive step towards the membrane classification that Bichat suggests in his *Traité;* Bichat himself, most loyally announcing what he has read, is to take charge of its promulgation.[14] He brought forth, moreover, the germ of the general idea of "tissue," and, accordingly, of the *Anatomie générale.* But this concept would not have fully ripened in Bichat's mind, had not the *Nosographie philosophique* taught him another important notion, methodological this time: the analytical procedure of sensualism, *la méthode de l'analyse,* as Pinel says.

The anatomist Bichat rapidly mastered the analytical method and was able to apply it to his own field. Three novelties, Bichat says, will greet the reader of his *Anatomie générale*: the plan, the facts it contains, and the principles of its doctrine. "The plan consists in considering separately, and in presenting with all their attributes, each one of the *simple systems* which with their several combinations constitute our organs."[15] Bichat, as will be seen, conceived the notion of disgregating the organs into their simple elements, just as Condillac analyzed "composite ideas" until he obtained in complete isolation the "simple ideas" of which according to him they are composed.

Here is apparent, with abundant clarity, the influence of the Condillac method upon the definition of "tissue":

[13] *Nosographie philosophique* (5th ed.) xviii-xix.

[14] Bichat classifies membranes into *simple* and *composite.* The simple may be enumerated as mucous, serous and fibrous; the composite, as fibro-serous, fibro-mucous and sero-mucous. He goes on to describe the membranes difficult to classify, and devotes a special section to the *accidental* or pathological membranes. He concludes his treatise with one monographic chapter on the arachnoid and another on the synovial membranes.

[15] *Anatomie générale,* Introduction.

All animals [writes Bichat] are an assembly of diverse organs . . . ; these are so many particular machines in the general machine of the individual. But these same particular machines are formed of many tissues of very different nature, which truly constitute the elements of such organs. Chemistry possesses its simple bodies which, by the diverse combinations of which they are capable, form compound bodies . . . ; in the same way anatomy possesses its simple tissues, which by their combination of four and four, six and six, eight and eight, etc., form our organs. [And after enumerating the twenty-one simple tissues isolated by him, Bichat concludes:] Here we have the real organizing elements of our bodies, whose nature is constantly the same wherever they may be found . . .[16]

Let us define the expressions of our anatomist: in his mind, "tissue" is an anatomical formation irreducible by analysis to other more elementary formations, and one whose nature is constant, whatever its situation in the organism may be, in the same way as the color red (a simple idea, according to Condillac's phraseology) is a sensation irreducible to other simpler ones, and, moreover, constant, whatever may be the real object to which it belongs. In other words: *as Bichat understood them, tissues are the "simple ideas" of the complex anatomical texture of the animal.* Sensualism, a cause of confusion to nosography in Pinel's hands, when employed by Bichat permitted a fruitful morphological result to be obtained.

The undeniably sensualist stock from which sprang the notion of tissue will appear even more clearly proved if we pause for a moment to consider the methods used by Bichat in his work. Even though he never went into details on his experimentation—and here some influence must be ascribed to the life-and-death haste that consumed him when mortally stricken—he says enough about his methods to enable them to be judged: "Among them [his experiments] there will be found a series of essays on all the simple tissues, which I have submitted successively to desiccation, putrefaction, soaking, boiling, baking, action of acids, alkalis, and so on . . ." Bichat does not set out, however, to determine the chemical composition of tissues, "but to establish the distinctive characters of these several tissues, to show that each one has its own particular organization of life, and to prove . . . that the division established by myself is not based on abstractions, but on differences in intimate structure." And now, with words that sound more like a slogan than a mere declaration of his scientific intention, he adds: "The different reagents of which I have availed myself I have regarded as no more than a supplement to the insufficiency of the scalpel."[17]

[16] *Ibid.*, Intro. §6.

[17] *Ibid.*, Intro.

Let us for a moment pass over this allusion to the "private life" of the tissues which Bichat lets slip, and observe how he proceeds in his work. He delicately desiccates the organs and systems until he obtains homogeneous sensorial fragments; he then submits the isolated fragments to the tests he has just listed; and if their behavior under each of these tests proves analogous, he adds this resemblance to the resemblance displayed by their sensory appearance before undergoing alteration by experiment, and concludes that all these pieces, despite their having been taken from anatomically distinct part of the body, make up one and the same tissue. ***A tissue thus stands defined by the homogeneity and constancy of its sensory appearance, whatever may be the conditions under which it is observed and the treatment to which it is submitted.***

All this has a name: sensualism. And may not the strange, almost incomprehensible confidence with which Bichat sat down at the microscope be one more proof of his fidelity as an anatomist to the gnosiological principles of Condillac? This "kind of agent," wrote Bichat of the microscope, "from which it seems to me that physiology and anatomy have never got much, because when one looks into the dark each man sees after his own manner . . ."[18] To judge from this, he prefers "to study nature in the place where she begins to come within the range of our senses," as he says in so many words when, in the *Anatomie générale,* he takes up his position in strict fidelity to the postulates of sensualism, in face of the contradictory interpretations to which microscopic study of muscular tissue was at that time giving rise.

In reading the above, we should not imagine that the name and notion of tissue first made their appearance in the history of biological morphology with the discoveries of Bichat. The origin of our notion of tissue is quite remote: it is found, as is well known, in the Aristotelian distinction between the "similar" or "simple" parts of the animal body and the dissimilar or "composite" parts. Aristotle described as "similar parts" all those in which a portion, however small it may be, can be called by the same name as the whole (for example; bone, flesh, fat), and as "dissimilar parts" those which do not fulfill this condition (the face, the hand, the foot). It is not hard to see how there exists in the concept of the "similar part" the germ of the idea of tissue. The fact that Aristotle included the organic fluids (blood, semen, milk, and the like) among the

[18] *Traité des membranes* (1st ed.) 32.

similar parts does not lessen the historical importance of his conceptual discovery.

Aristotle's classification was taken up and transmitted by Galen. Long afterwards, when fibre is seen to be the final constituent element of the animal body (Fernel, Fallopius, etc.), the solid "similar" bodies will be construed as a warp and woof of elementary fibres, in other words as a "tissue." In Fallopius, for instance, this word appears quite plainly: *Tertius usus fibrarum est ratione texturae,* he says in his little treatise *De partibus similaribus,* and in another place he compares the structure of animal membranes to a cobweb (*telae araneae similium*). This notion is never again to be lost sight of in the history of morphology. Next, Ruysch and Boerhaave created the concept of "cellular tissue" (*membrana cellulosa*); Haller made this "cellular tissue" the natural basis of almost all the solid parts;[19] finally, Bordeu distinguished a *tissu muqueux* and a *tissu conjonctif.*

Once more Bordeu is the immediate predecessor of Bichat. But, as Flourens said, Bordeu saw only one point in general anatomy, whereas Bichat has seen it as a whole. Bichat, moreover, considers "tissue" not as a hypothetical warp and woof of fibres, but as a simple sensory formation, whether formed by this assumed weft of filaments or not. The *tissu* of Bichat's general anatomy represents, in the last resort, a sensualist, experimental, and solidist version of the Aristotelian "similar" parts.

As many as twenty-one simple tissues were distinguished by Bichat. Seven of them are dispersed throughout the organism and were hence called by him *general*: 1. Cellular system; 2. Nervous system in animal life; 3. Nervous system in organic life; 4. Arterial system, or vascular system of the red blood; 5. Venous system, or vascular system of the black blood; 6. Exhalatory system; 7. Absorbent or lymphatic system; 8. Osseous system; 9. Medullary system; 10. Tendinous system; 11. Fibrous system; 12. Fibro-tendinous system; 13. Muscular system in animal life; 14. Muscular system in organic life; 15. Mucous system; 16. Serous system; 17. Synovial system; 18. Glandular system; 19. Dermic system; 20. Epidermic system; 21. Pilous system.

All these tissues represent so many morphological and tectonic units; their various combinations, Bichat tells us, constitute the material of the

[19] "I have learnt from experience that nearly all the solid parts of the human body are mere cellulous membrane (*meram cellulosam telam*), very dense and intricate." (*Haller, Elem. phys.* I, 19)

visible organs. Simple tissues are distinguished from one another, in fact, by their form, their internal organization, their properties and their ontogenetic development.

The differences of *form* are not essential, because "one and the same tissue sometimes displays itself in many different states; thus, nervous tissue appears in the state of membrane in the retina and in that of cord in the nerves; fibrous tissue, in the form of fascicles in the ligaments and as a membrane in the aponeuroses..."

More specificity is conferred upon the tissues by the character of their organization or internal constitution. In regard to the peculiar substance of each tissue, Bichat observes, "the differences are noteworthy; for the color, thickness, density, resistance, etc., in no way resemble one another. Simple inspection is sufficient to see a quantity of attributes characteristic of each one and exclusive of the rest . . ." But we have already seen that Bichat does not rely on mere observation but employs experiment: "I have availed myself of the action of several reagents, with the object of leaving no room for doubt on this point." And after again enumerating his different analytical methods, he concludes: "These actions have brought about various changes in each species of tissue, thus the results have been nearly all different: each tissue has its own mode of displaying its several alterations, each furnishes particular products of its own, and no one of them resembles another." The irreducible specificity of each simple system's "organization" was thus established.

So far everything was perfect. Suddenly there arose in Bichat the vitalism that followed the trail of Bordeu, and this fresh stroke of his pen seriously detracted from the beauty of the picture. It is not only by their form and organization that the tissues are to be distinguished from one another; they differ by reason of their properties also: "Nature, in giving each system a distinctive organic disposition, has endowed it as well with different properties." These specific properties of each simple system are of two kinds: those of "tissue" (*propriétés du tissu*) and the "vital" ones. The first are dependent on their material organization and can be observed, therefore, in the body of the cadaver. Bichat reduces them in a first analysis to extensibility under tension, and the spontaneous contractility of the sectioned fragment.[20] Every tissue no doubt possesses an extensi-

[20] Elsewhere (*Anat. gén.*, Intro. §5) Bichat devotes much careful study to a third *propriété du tissu*: the contractility of the distinct tissues under the action of heat and acids. This is "contractility by shrinkage."

bility and contractility quantitatively and qualitatively its own. But, according to Bichat, simple systems also are distinguished from one another, and not only by the fact that such and such a vital property predominates in each (e.g. animal sensitivity in the nerves, animal contractility in the voluntary muscles) and by the "distinct character of their own" that these vital properties acquire in all of them, but because "each tissue has its own peculiar mode of forces, sensitivity, and so on."

The outcome can be foreseen: Bichat is going to turn tissue into the vital physiological unit of the animal organism; the "organs' life of their own," so central a point in the vitalism of Bordeu, will become "the tissues' life of their own"; to the organic vitalism of the Béarnese physician, Bichat opposes a tissue vitalism. This was most vigorously asserted by our biologist:

> Since the times of Bordeu, much has been said of each organ's life of its own. . . . After the exposition I have just given . . . this idea of a life of their own cannot be applied to the organs, but to the tissues.

Granted that tissue is the basic conception in anatomy, Bichat thinks it should be so in physiology as well: one more example of the subordination of function (form in time) to visible shape (form in space) so frequently repeated since Leonardo and Vesalius and so great a cause of aberration in biological thought.

> When we study a function, it is very convenient to consider, in a general way, the organ that exercises it; but if it is sought to ascertain the properties and life of this organ, it is absolutely necessary to take it apart (into its several tissues). Just as in anatomy: when no more than general notions are being sought, each organ may be considered *en masse;* but it is indispensable to isolate its tissues, if we are proposing to analyze its innermost structure with exactitude.

Although interpreted by a tissue criterion, physiology is for Bichat what it was for Haller: *anatomia animata.*[21]

To sum up: for the founder of general anatomy, tissue is the morphological and physiological unit of the living being. From the morphological point of view, the organs, and, consequently, the animal organisms, are combinations, put together in varying shapes and forms, of a certain

[21] Let us observe wherein lies the illegitimacy of Bichat's conclusion: it lies in his reasonable, even brilliant, assertion that tissues possess *specific physiological functions*; muscular tissue, for instance, is not nourished in the same way as nervous tissue is, and whatever the bodily site to which the muscular fibres belong, its nutrition is effected in an analogous fashion. Bichat deduces that each tissue possesses *a life of its own;* and, worse still, he turns all these "tissues' lives of their own" into vital units. The same conceptual error will be committed later by Virchow, reading "cell" where Bichat spoke of "tissue."

number of different tissues. From a physiological point of view, the proper function of each organ and the total activity of the living being cannot but be, in the last resort, the result of adding and combining together the particular vital activities of the tissues that compose them: "Unless we keep clearly distinguished what belongs to each one of the tissues of whose combination composite organs are the result, the expression 'life of their own' suggests nothing but vague and uncertain ideas." The life of the individual, in short, would not be a primary unit but a terminative aggregate.

All the above makes Bichat's descriptive scheme quite intelligible. His *Anatomie générale* is composed of as many tissues or simple systems as its author distinguishes. Each one of them is thereafter studied according to a uniform plan determined by the four dimensions of tissue specificity: form, organization, properties, and development. In the section dealing with "form" Bichat describes the arrangement of the tissue in the animal organism and its outer configuration. The word "organization" refers, as we have already seen, to the texture or inner configuration of each simple system, so far as the latter can be grasped by sensory observation of the tissue in its natural state and its changes under experiment. The article relating to "properties" sets forth in succession the three distinct orders into which these are diversified: physical properties (hardness, elasticity, and so on), properties of texture (extensibility under tension, spontaneous contractility, induced contractility of an isolated fragment) and vital properties (organic and animal sensitivity and contractility, sympathies). The aggregate of all these properties in Bichat's eyes constitutes a strictly specific mark of the simple system in question. The description of tissue concludes with a very cursory and by no means precise reference to its embryological development.

Such, synoptically viewed, is the "general" anatomy that Bichat erected alongside the old "descriptive" anatomy. One objection is suggested by the name: does an anatomy merit the designation of "general" merely because its descriptions take tissue instead of organs as their basis? Is it to this that a "general" anatomy is to be reduced? The morphology of the German idealists (Goethe, Oken), and even certain morphological probings on the part of Bichat himself—his observations on the difference existing between the form of the organs of animal and those of organic life—speedily return a negative answer to the two queries.

Ernst Krackowizer as a young student

A Refugee Doctor of 1850

ERNST P. BOAS*

Foreword

IT IS NEARLY one hundred years since the students of the University of Vienna led the revolution against the absolute government of Austria and drove out Metternich, the chief agent of reaction. Ernst Krackowizer, then 27 years of age, well launched on a brilliant career as first assistant at the surgical clinic at the University of Vienna, joined the fight for freedom and became a captain in the Academic Legion. After the final defeat of the insurgents he had to flee from Austria, and came to America, a refugee. He established himself in practice and within a decade became one of the leading surgeons in New York City. A lively chronicle of these eventful years of his life is preserved in the letters that he wrote to his fiancée, Emilie Forster, who later joined him and became his wife. The following translated excerpts from these letters reveal the passionate idealist of the revolutionary days, and give a penetrating, humorous, but sympathetic and enthusiastic account of the first reaction of a cultured European to the American scene.

Ernst Krackowizer was born in 1821 in Spital am Pyrhn, a small town in upper Austria. His father was an officeholder of modest income under the imperial government. Krackowizer matriculated in the medical faculty of the University of Vienna in 1840. In those days the medical school was at its peak with Rokitansky, Skoda, and Schuh among its leading personalities. He spent his third year at the University of Padua. For two years after his graduation he took special operative courses under Professor Schuh, one of the leading surgeons of the time, and in 1847 became Schuh's first assistant at the university clinic. When the

Editor's Note. The letters herein quoted have been selected from several hundred that had come into the possession of Dr. Krackowizer's daughter, the mother of Dr. Boas. His father, Dr. Franz Boas, had had a complete transcript made of the original letters many years ago, and it is from this transcript of his grandfather's letters that Dr. Boas has chosen and translated the present excerpts. The originals are now lost or misplaced, but the full typescript of some 533 pages is being presented to the Library of the New York Academy of Medicine.

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revolution broke out in March 1848, Krackowizer at once threw in his lot with the revolutionists and became one of the leaders among the students. In October 1848, the Croats besieged Vienna, the city was finally captured and the back of the revolution broken. As a captain in the Academic Legion Krackowizer was a leader in the defense of the city. Subsequently he had to flee, and at first went to Tübingen where he was made clinical assistant in surgery under Bruns. But the power of reactionary Austria became ever stronger, and for fear of extradition he again had to leave. No place in Europe was safe for him, so in May 1850, he sailed for the United States.

Krackowizer first settled in Williamsburgh at 105 South 4th Street and quickly gained an adequate practice. In 1851 he became surgeon to the Brooklyn City Hospital, now the Brooklyn Hospital, where he served until 1857. That year he moved to Manhattan to 49 Amity Street, now West 3rd Street, and finally to 16 West 12th Street. In 1852, together with Dr. von Roth and Dr. Herezka, he brought out the *New-Yorker Medicinische Monatsschrift* which was discontinued after one year. In the first number of this journal there appears a letter addressed to the medical profession in Germany, which reveals the idealism of these young immigrant physicians. It says in part:

> There is no doubt but that there soon will be State universities which, unlike the European Universities, will be free institutions for the most advanced instruction. This again illustrates the development of the American spirit, which first assures itself a solid base, and only then reaches for the apex. The political powers in Europe were interested in keeping the masses in ignorance, and permitted only a few men to become learned. That is why the universities are older than the elementary schools, which were established with great difficulty. But in America the people first initiated general popular instruction; they sought to develop not a few erudite individuals, but a cultured and educated people.

Krackowizer became a devoted and useful member of the New York Pathological Society, of which he served as president, and of the New York Academy of Medicine. He served for years on the Committee of Ethics and on the Committee of Ways and Means of the Academy. In 1857, with the founding of the German Dispensary, he became one of the most active members of its staff, and was subsequently a leader in the establishment of the German Hospital, now the Lenox Hill Hospital. He also became attending surgeon at Mt. Sinai Hospital, New York Hospital, and Bellevue Hospital. During the Civil War, he served as Special Inspector of Hospitals, and on several occasions was called to

the battlefield, to Bull Run and to Fredericksburg, when expert surgical aid was required. He was a member of the U. S. A. Sanitary Commission of the Civil War. He carried his ardent republicanism with him when he became an American citizen; he was a free soiler, an abolitionist, a supporter of Lincoln and of the Union. He was among the first, after the war, to become an independent voter. He was active on many civic committees.

He died in 1875, at the age of 54, from peritonitis following typhoid fever.

Text of Letters

Vienna, August 15, 1848

Whoever has dived into the whirlpool of public life in Vienna moves in a magic circle from which he cannot escape. The demon of politics has entered my soul, or rather, has long been latent within me, but now he is active. But it is not a bad demon, no fanatic, but one who instills me with the deepest conviction that it is everyone's duty to contribute to the best of his capacity to the good of the whole. I do not lay claim to any particular abilities, I am not ambitious; but I cannot deny that in the small circle in which I am known I have an influence that bears good fruit. And so I shall stay in Vienna, although the decision has been a difficult one, and I hesitated a long while. I should lose your respect, too, if I shirked the common duty to further the movement as much as possible. . . . I am still an arch republican, and you will not be astonished to learn that I am converted from being a heretic and have become a German-Catholic. Now don't be alarmed—this religion has some soundness, does not force your conscience, and is closest to that religion of reason that every mature person makes for himself.

Vienna, August 27, 1848

Oh, this miserable captaincy; if only I could get rid of it. But it can't be. None of the many who could do the job better have the time, and I regard it as my duty to respect the confidence of my comrades. Perhaps they will soon become tired of me, for I cannot learn the art of commanding; it is too difficult for me. . . .

Do not worry about me. I will not let myself be deceived by any phantom. I am not easily carried away; I am able to judge the times and people. My ideals are unalterable, and no one can rob me of them.

It is just because my ideals are so sacred to me that I have cool blood and judgment enough not to place these ideals on the altar, before I am certain that they will be worshipped. They are too holy for ridicule, or for blind fanaticism. So do not fear that we will prematurely declare a republic in Vienna, or that if a few hot heads do so, my name will be among them. Just because I want the republic as soon as possible, I resist every action that would force it upon the people against their will. We can let the servants of the throne undermine it in their wicked and unbounded eagerness. I shall always stand in the front ranks of the fighters for freedom, even if it involves a certain peril. All people are exposed to danger, even the man sitting behind the stove is not safe. . . .

Vienna, October 14, 1848

I have a strong belief in the future, and in victory for the good cause. I am no dreamer, I can honestly say that I have retained a cold deliberation in moments of confusion. I know that both sides make mistakes. But since one must take sides in such extraordinary times, I would rather join the extremists who worship a beautiful Utopia than a party that is bare of ideas, and that from selfishness and short-sightedness wants to maintain the status quo. . . . I beg of you, do not succumb to the rule of those catch words, anarchy, turbulence, terrorism and the like, with which wicked or fearful persons are blackening our party. Where is the anarchy? Can one imagine a greater moderation than has been shown by the people in their victory? No educated person will excuse Latour's murder,[1] but one should be honest enough not to isolate this act from the events that led up to it. To imagine the reverse side of the picture, what would have happened if the people had been defeated? How many sacrifices would so-called law and order have demanded, how many gallows would have been populated, what would have happened to the right of freedom of speech and of the press and of assembly, how many would have disappeared forever in the darkest dungeons? It is perfidious to declare the whole party guilty for one wild act of self-protection carried out by a few in rage and excitement. The liberal party does not assume responsibility for the murder of Latour. There has been no revolution that has been holier in its motives, more exalted in its battles, and nobler in following up its success. The so-called proletarian is in an exalted mood,

[1] Latour, Minister of War, was killed in a popular uprising on October 6, 1848.

is capable of enthusiasm and sacrifices that are foreign to the majority of the middle classes. In Vienna there reigns order, a respect for laws that is unexampled. But the powers do not want that—they want to drive the people to despair so that they will be forced to some extreme act, so that then they can be indicted under the guise of legality. I beg everyone, who is so indignant about the lynch justice meted out to Latour, to regard the behavior of our court and of its mercenaries. Is there a page in history so filled with the choicest horrors as this Chimborazo of treachery?

Vienna, November 1, 1848

These few lines as a sign that I am bodily unharmed.[2] You can imagine how I feel. Life would be unbearable if it were not so clear that the victory of reaction is only a temporary one, yes that we, the conquered have actually won. The dynasty is lost, the monarchy broken, the European war has begun. May those be held accountable who drove the people to despair by force and by deceit. The rule of sabers may last out the winter, but when spring comes the thirteenth of March will again be here and the year 1849 will not be behind 1848. It is true we have no arms, but necessity will find a way. Unfortunately there will be still greater devastation.

I do not know what will happen to us. Of course, the legion will be destroyed. If the captains seem of sufficient importance I, too, will have the honor to be a victim for a while. Whatever may happen, I believe the university will be closed for a year.

Tübingen, January 7, 1849 [It had been suggested to Krackowizer by a friend that he practise medicine in the Orient.]

There are cities of 20,000 to 30,000 inhabitants, especially in the ducal cities on the Danube where there is not a single physician, where one could easily make a good living. Hardly does a ship appear on the horizon than the sick Moslems call to them through megaphones to find out whether a doctor is on board. If there happens to be one, the good man is almost torn apart, so many besiege him to ask advice. This charming picture was presented to me, together with the additional favorable circumstance that Europe is so close by. But for me this is just a reason to prevent me from going there. I am an Austrian rebel who could not obtain the protection of an Austrian consul, supposing it pleased a be-

[2] On October 31, 1848 the Croats captured Vienna, defeating the revolutionists.

whiskered pasha to get after me. How could I protect myself from such an eventuality except by becoming converted to Islam? Do you want to become a Turk? Of what good is it to me that the Bosporus separates Asia from Europe by the distance of a cannon shot, if I am proscribed in Europe? Europe would be much closer to me in the United States, where customs and habits resemble ours, while one would never feel at home among the Moslems. I cannot reconcile myself, even if it means one hundred times as much income, to give up every vestige of culture and to have to witness daily most outrageous tyranny. The fact that the victims of this tyranny are totally foreign to me in descent, religion, and culture makes no difference. One must either howl with the wolves or fight them. The first I do not want to do, the second would defeat the advantages that the Orient is supposed to offer me.

Frankfurt, a.m., March 30, 1849 [To his prospective father-in-law]

With all my enthusiasm for principles, and all my impractical idealism, I have enough common sense to know that not only if one wishes to be happy, but also if one wishes to be of some use to humanity, one must be sound and sensible in the daily routine of living, and that the greatest part of one's duty as a citizen is discharged if one competently follows one's profession. I have chosen my profession after careful reflection and I love it and have capacity to pursue it. My chief aim in life is to achieve the utmost I can as a physician. It has never occurred to me to follow politics as a career. But I have the firm conviction that every citizen should concern himself with politics. I believe that a happy medium can be found between political indifference, charlatanism, and fanaticism, and that one should demand this measure of political participation from every man. I know that this happy medium is not easily arrived at, and that I have not yet learned it. But I am sincerely trying and have learned enough, particularly in recent times, to recognize that one need not beat one's head against the wall to prove that one is an honest man. Our political views are far apart but you must grant me that I have been led only by pure motives, and that I have used and will tolerate only honest means to achieve my ends. I believe that, if I continue along this path, both as physician and as citizen, I will reach a position of security and honor, and will at the same time be able to remain true to my convictions. . . . As I review my life during the past months, I must confess to myself that my political views have become less absolute and that toler-

ance for different opinions, which never deserted me, is achieving the upper hand.

Tübingen, June 5, 1849

The professor of surgery, Bruns, received me very cordially and assured me that as far as he and the faculty are concerned, the position of first assistant would certainly be given me. There remains the possibility that the government may not approve the appointment, which is very improbable. The decision will take at least four weeks. The duties are about the same as in Vienna, except that I shall have a second assistant under me. The hospital is a beautiful new building, so my rooms will be pleasanter than in Vienna. My salary will be 400 Fl. rhenish, for which one can live better here than with the same amount in Gulden in Vienna. I shall be able to earn another 400 Fl. from lectures, since it is customary here for the professor and the assistant to divide the courses. The professor, of course, will give the best paid ones (operative surgery and special lectures on surgery), so there remains for me bandaging and instrumental instruction, surgical review, and ophthalmology. Literary publications will bring in another few hundred Gulden, and practice will come slowly.

Stuttgart, July 17, 1849 [To his prospective father-in-law]

Since no decision about my appointment has been reached I came to Stuttgart today and visited the secretary for education, Schmidlin, and asked him for an early decision. He answered me very honestly as follows: He had wondered why I, with a good appointment in my possession, should apply for the much less desirable one in Tübingen. So he inquired in Vienna about me and learned that a criminal indictment had been started against me. Because of this he could not approve my appointment and had yesterday returned my nomination to Tübingen. I then explained to him my position and asked him if I might remain in Tübingen for a while. Whereupon he advised against it. If the man had not been so kind and understanding, I should have worried lest the police in Tübingen had an order to arrest me. I shall return to Tübingen tonight, pack my things and tomorrow go to Niedernau, a spa two hours from Tübingen. I shall stay there until I get word from Stuttgart whether and when I shall get a passport to be able to cross the guarded German border. I hope it will be with permission to go to Belgium, but shall have to be satisfied if I get permission to go to a Swiss or Alsatian

border town. . . . I have only two alternatives, either to return and give myself up, or else to go somewhere where I will not have to worry that they will pay attention to the demands of the Austrian government. Thus Austria and Germany are out of the question. I believe that there will not be a country in Europe that within a short time will not belong in this category. There remain possibly Switzerland, France, and Belgium, but they offer me no advantages, for with the social circumstances in Europe, the establishment of a successful career demands prerequisites that I cannot fulfill. So it may become necessary to prepare myself for an ocean journey.

Tübingen, July 22, 1849

The medical faculty is highly indignant about the action of the Secretary of Education. At a faculty meeting yesterday, they unanimously decided to protest. They suggest giving me a provisional appointment to give them time to persuade the secretary. . . . I do not believe it will lead to anything because once the government has inquired about me in Austria, my appointment would be a direct slap at them. If they had appointed me, and then Austria had protested they could have expressed regret that they did not know about me in advance.

Tübingen, August 16, 1849

The government replied today refusing my appointment, not out of consideration to the Austrian government, but as a matter of policy. . . . The professors now suggest a way out. The faculty wants to give me a temporary appointment during the vacation season, in the hope that when the school year begins, things will have straightened themselves out. Of course, this will lead to nothing, and I told them that I would accept the interim appointment only with the understanding that I might leave at a day's notice if another opportunity turned up. . . .

You wish to know what I shall be able to do in America. First of all, I want to support myself through the practice of my profession. There are no opportunities in the large cities. I should have to go west as soon as possible where the new settlements are without doctors. Of course, that would involve many hardships at first, and one would have to expect to be paid by the produce that the earth yields to the young citizens of the new world. There is no money in the western settlements, there is only exchange and payment in kind. But with the tremendously rising prosperity of America a few poor blockhouses in a few years develop

into a city of 12,000 inhabitants. If one bears the first hard times with courage, one can look forward to a happy successful future. No one who is willing to work perishes in America. If at first my means do not permit me to start a medical career, I am prepared to rely on my healthy arms for a while. What here in Europe would be oppressive for a member of the so-called better classes, is easy to bear in America, for there nothing is disgraceful except to live without work; the thing that gives a man social standing in Europe is to be able to say, "I live from my capital." The American treats his worker as his equal and does not call him servant, but aide. The daily wage is high—2 dollars (equal to 4 Fl.) By working faithfully for a year a man can save enough to buy a farm, for Americans give credit freely on anything that represents real usefulness. I have no fear once I am over there, and I have enough money now for the voyage. Perhaps I can travel free as ship's doctor. I shall wait only a little longer until I am absolutely sure that there is no hope for a position in Europe. Then I'll go without delay, for the cost of a day in Europe equals the cost of one acre of land in America. Of course, I would be happy with a university position in Switzerland, but one cannot live from what one gets as docent; one has to have funds to last at least two years. The hungering docents of Germany have become proverbial.

Tübingen, September 14, 1849

Every educated European has needs that cannot be satisfied in America. It is proverbial that no immigrant becomes a real American, and it had always been my view that emigration to America is in large measure a self-sacrifice for the sake of one's offspring. But my experiences in these past two years have clarified my thoughts. It is very superficial to regard the present movements in Europe as the result of some administrative abuses that a few agitators out of ambition or ignorance have blown up and greatly exaggerated. It is an error to believe that the exhausted masses can be bribed with a few scraps of food to stone the false prophets. What is clear to thousands, and is driving millions instinctively, concerns the whole man, both in his inner and outer being. . . . The drama has just begun and may play on through two generations. Consequently, those living today who do not live for themselves alone have a difficult decision to make. For the single individual the choice is easy—he devotes himself to what seems to him the general

welfare. But he who envisages as part of his life the need of preparing a happy future for his dear ones has a more difficult decision. One cannot accuse him of lack of community responsibility if he chooses a new fatherland, where without struggle or effort he finds conditions for which he would have to sacrifice the best part of his life here. It is these thoughts that guide me in thinking about emigration to America. If I could convince myself that by staying in Europe I would not sacrifice the happiness of my offspring, the blows that might strike me personally would not frighten me from remaining. On the other hand, if every opportunity to establish myself in Europe is cut off from me then I shall have to cross the ocean. I am far from undertaking this step lightly. I am well aware that the political conditions of America which appeal to me so will not compensate me for much that I shall leave behind me. I am not so abstract a politician that I would find my needs satisfied by living in a virgin forest, just because the police could no longer molest me.

Tübingen, November 13, 1849

My plan to go to Texas rests chiefly on the cheapness of land there, and the high wage level. The climate is unhealthy only along the coast in the spring and summer. The interior is the healthiest climate of America and approximately corresponds to that of southern France. It is true that from time to time there are difficulties with the redskins, whose power, however, is largely broken. Organized attacks no longer occur, only fights with individual thieves. But when they are alone they are cowards and easily put to flight by a few shots. I had thought of Texas only in case I have to leave during the winter, because farming there begins in February. In the northern states it begins later than it does with us. If I do not go before spring, I wish to avoid the southern ports, because of the unhealthy climate along the southern coast. Then I would go to the west or northwest via New York. My favorite states are Pennsylvania, Missouri, Ohio, and Wisconsin. Of course, I should prefer to continue my medical career, but one must not deceive oneself. In populated regions and cities there are as many doctors as there are in Europe. In addition, there are many quacks who at first always have one at a disadvantage. I have no doubt that I could obtain a good practice, even in a large city, if I had the means to stick it out for a year. Since this is not the case, I should have to become a country doctor on the

frontiers. But this, too, is very difficult. One is paid only in goods and produce which one in turn has to sell. I am not suited to trade and making profits. It is a mistake to think that competent physicians are rare in America. With only half the population of Germany, America has twice as many medical schools. It is true, our professors look down on these schools, just because they are not German, but there are many excellent practitioners and very bold and skillful surgeons. So I shall have to say farewell to a medical career for the time being. . . . There remains for me only a means of existence for which nature has given me the means—my hands. In America they will find plenty to do if they want to pitch in. I am not lacking in willingness, and skill will come later. I am free of the European prejudice that regards hard labor as something degrading. If I work hard I should be able to buy a farm in two years. My ambition has never been great, and now it has died. I can be happy as a farmer and can look without bitterness at the intellectual fame of men whom perhaps I could easily have outdistanced, had I been able to remain in my original course. In modest rural comfort we can confidently look into the future, the happiness of our children will be assured; we shall be in a safe port with them, while hatred and envy are destroying Europe, while the best selfless striving is wrecked on the rocks of authoritarianism. Generations must die physically and intellectually in the fight against tyranny before Europe will reach that level of true culture which America offers us in return for a few short years of hardship.

Tübingen, December 28, 1849

I have learned that medical conditions in America are pretty bad. The large cities are overfilled with doctors; if one has not the means to start with some degree of outward show, one does not get ahead. Although there are very many German doctors in New York, only three of them are busy. The others eke out a bare existence or change to other occupations. Of course one must master the English language. The other large cities are about the same. In the small towns and in the country the honest physician cannot compete with the innumerable quacks, and of course one cannot make a living from surgery in a small community. If a doctor honestly admits a limitation of his powers it is equivalent to a confession of incompetence. The most impudent go the furthest. So you can see how suited I am to be a physician in America. I just

cannot play false to any of my convictions. Shall I escape from the vulgarity and conservative stupidity of Europe to have to belie myself in America? Well, since what I have learned here is useless, I must find another occupation. I do not know a trade, so if I have enough money left to travel from New York to Wisconsin I shall go there and work for a farmer. Thus I will learn American agriculture and save enough in a year to buy myself 40 to 80 acres of public land. Then I shall be a free man, dependent on no one, only on the earth and the weather and my health. If I knew a trade or music, I could make my way in a large city. Teaching music, especially, brings in a good income; so do baking of fancy cakes and manufacture of chocolate. But there is no use anticipating. One takes what comes along. The most important rule in America is not to insist on a single occupation, but to be prepared to do whatever seems to be most favorable. F. will give me the addresses of several good German doctors in New York, but he doubts that this will be of use. He told me of several competent doctors for whom he tried his utmost, but in vain. He could not get them on their feet. From others I have heard similar reports. . . .

The cost of the ticket to America depends on the number of ships and the number of passengers. If there are few ships and many passengers, the price goes up. Two years ago it cost 130 Fl. from Havre. Usually the price is 60 to 70 Fl. without food from Mainz.

Tübingen, January 16, 1850

I have had a letter from S. which relieves me of most of my worries. He has given me a recommendation to a business friend in New York as well as a letter of credit of $200 (440 Fl.). So I will be able to live half a year without earning anything, and within this time some source of income will surely materialize. Now I am happy because I believe I shall be able to continue as a physician. Of course, I do not count on being able to remain in this metropolis, but I shall have the opportunity to get the advice of many wise and well informed men. . . .

The trip from Bremen to New York costs almost 200 Fl. and that does not include the trip to Bremen. That is pretty high for me. I have just learned that a ship has been built for service between Hamburg and New York on which the ticket second class will cost 80 Thaler Courant, which I believe is 140 Fl. . . . I should be able to make the trip from here to Hamburg for 30 to 40 Fl. It is true that one can travel steerage on the regular emigrant boats for 80 to 100 Fl., but it is

said to be a punishment as bad as a prison. Furthermore the saving of time is worth considering. From Hamburg at the most 3 weeks, from Havre 4 weeks but often 5, rarely 6. The Hamburg steamer is to sail on the 6th of April. From Bremen there is a ship on the 15th of March and one on the 15th of April. From Havre 3 sailboats go every month.

Tübingen, January 26, 1850

My old luck is returning. My cousin Krackowizer, the postmistress in Enzerdorf, has voluntarily offered to lend me 1000 Fl. I never paid much attention to money in the past, but now I value it as a means to enable us to reach our goal earlier. Now I can settle in a large city, and with that degree of independence which is so important to gain the faith of the public. Even if I have no income for a year, I can live decently and in this time I will surely become known. . . .

Yesterday I signed the contract for my passage on the Steamer Helena Sloman. The cost is 140 Fl., the trip to Hamburg will cost about 30 Fl., so from Stuttgart to New York it will cost 170 Fl., about one-third more than in an emigrant boat steerage. I shall have more comfort, a reliable shipping firm and a shorter voyage—22 days.

Tübingen, February 23, 1850

I have neglected to tell you how long letters take from New York to Steyr. One usually mails them via Liverpool, because there are two postal steamers between these two cities every week. On the average the steamer makes the trip in 16 days. There is only one boat a month from Bremen to New York. A letter from Liverpool to Steyr should take 5 to 6 days. Thus the shortest time for a letter from New York would be about 3 weeks. If I go to St. Louis or Milwaukee it will take 8 to 10 days longer for a letter to reach you. To avoid disappointment, we had better count on 6 weeks, and during the winter possibly double the time, for the freezing of the rivers and canals slows the mails, and there is at most one steamer from Liverpool.

[Krackowizer sailed from Hamburg on the S.S. Helena Sloman on May 29, 1850. They were detained several days in Dover because of breakdown of the engine of the ship. They arrived in New York on June 29, 1850.]

New York, July 2, 1850

We arrived at 8 in the morning on the 29th of June. I was the second off the ship and went to nearby Greenwich Street where most of

the hotels for immigrants are located. I found the Greenwich House within 5 minutes and ordered rooms, also for 11 of my travel companions. Then I gulped down some delicious Bavarian beer, and had some fresh bread and tea—things I had gone without for 3 weeks. Then I returned to the ship for customs inspection which was very superficial. I got my hand baggage quickly but the trunks and boxes were greatly delayed in coming from the hold. After hours of waiting, I finally got one of my boxes. Since the next day was Sunday, I had to wait until Monday for the rest. On Sunday a number of us made an excursion to Hoboken—a plateau on the right bank of the Hudson. I was delighted with the luxuriant vegetation, much of which was strange to me. From an inn on the heights one has a gorgeous view of New York (500,000 inhabitants) and the nearby cities of Brooklyn (80,000) and Newark (30,000), Jersey City and Williamsburgh (smaller towns, the size of which I do not know). We returned in the evening. It was very hot and I drank I don't know how much soda water. The heat alone would have kept me awake, but in addition certain insect enemies of Morpheus made sure of it. One encounters these gentle creatures almost everywhere in America. The following day I placed the table in the middle of the room, covered it with my robe instead of the mattress and so sleeping on the table was better protected. Aside from this the hotel is good. The food is excellent and plentiful and the cost is only half a dollar for room and board. . . .

Yesterday S. called for me and took me to his home in Brooklyn. Most of the German merchants live here and have their businesses in New York. He introduced me to Dr. Kalt (the busiest German doctor in Brooklyn) who, luckily for him, arrived last year at the time of the cholera epidemic. They did not give me an unfavorable prognosis, in spite of the fact that in recent years many able German physicians have settled in New York and Brooklyn. But they advised me to visit Philadelphia and Boston first and acquaint myself with conditions at first hand. It appears that it is no easier to get ahead in the West—Cincinnati and St. Louis—since these cities are not growing more rapidly than the Eastern ones, and there are still more German doctors to be found there. I can see already that I need have no fear about making my way. It is not so very different than in Europe. It is true there are many quacks and fakers who practise most shamefully. The only difference is that here it is done openly while in Europe it is all under cover. Here there

are no sanitary laws. They exist in Europe but are not enforced. The supposed strict American etiquette in clothing is a pure invention, and is enforced only for formal visits. On the contrary, people dress much more comfortably. Straw hats and light summer clothing are worn by all classes of society. One sees no gloves. That is such a beautiful custom that it alone would warrant immigration. Beards are not looked on askance, indeed they are not noticed, although a few years ago if you walked on the street wearing a mustache all the boys would be running after you. Real Americans rarely wear beards, but since the visit of the Hungarians some Yankee dandies are beginning to decorate their upper lips. It is absolutely certain that within five years the whole Union will be bearded. So I have not yet sacrificed my own beard. . . . The strict religious Sunday has received a severe jolt under the powerful stimulus of the example of the immigrant Germans. On Sunday, we saw thousands of Americans enjoying themselves in the Elysian fields. So the difference in customs is not so great; in fact, a German would feel much stranger in France or Italy than in America.

New York, August 17, 1850

My address is Dr. Ernst Krackowizer, 105 South 4th St., Williamsburgh, near New York. In telling you how to address me, I reveal where I live. I have settled in Williamsburgh. Now I will tell you how that came about. Eight days after my arrival I visited Philadelphia, where conditions are much the same as here, but less inviting because in that city no dignified professional relationships have developed as they have here among the not inconsiderable number of German doctors. Moreover, homeopathic humbug is much more widespread there than in New York. So I returned to New York. I was thinking of making a trip of exploration to the West, but then decided that the fifty to sixty dollars that it would cost would keep me for two months in New York. I was told by everyone that I would not find conditions as favorable as here, not even in Cincinnati and St. Louis. Then I had to choose between New York and some of the adjacent cities. It is true that there is room for another twenty competent German doctors in New York, but one must have enough money to live one or two years waiting for a practice. Conditions are about the same in Brooklyn. Dr. Gescheidt advised me to settle in Williamsburgh. He has been here for seventeen years and is the busiest German doctor in New York. He undoubtedly earns $8000

a year. He has really blazed the way for German doctors, because, scorning all humbug, he has brought honor to the German name by his perseverance. He has helped many German doctors, Dr. Schilling for instance. Schilling has been here little more than a year and has a decent practice, a horse and carriage, and has recently been appointed inspecting physician at the Emigrant Hospital at a salary of $600 yearly. Gescheidt has a brother in Williamsburgh and he himself treats a number of families to whom he will introduce me and recommend me as family physician. I will have no competition there, and people are yearning for a German physician. I should soon get American families, too, for there is no competent American physician in Williamsburgh. The few doctors who are there are said to be drunkards, and moreover they maintain their own drug stores, which is a disadvantage to the German apothecary. So the latter is on my side, and will send me all patients who first go to the drug store, and they do that much more than they do in Europe.

Williamsburgh has an excellent future. In 1840 it had 5000 inhabitants, in this year's census 25,000, not counting the neighboring towns of Bushwick, Flatbush, Navyyard, and Wallabout, which add again as many. . . . Business in New York is growing tremendously so that the increasing business section is crowding out the residence section. The city is enlarging up along the avenues and 48th Street is already well built up. But the well-to-do do not settle there since they can live more pleasantly on the other side of the river, and are nearer to the business part of town. Wall Street is the center of business; here are the stock exchange, the custom house, and several dozen banks and insurance companies. You can reach Wall Street from South 7th Street, Williamsburgh, more quickly by the Peak Slip ferryboat than from the upper parts of Broadway. Moreover, the ferry costs only four cents, the omnibus six cents. Brooklyn has many advantages over Williamsburgh and has become an important city of homes. There are streets a mile long where there are only residences, and not a single store is visible. But the lots are expensive and the city is growing inland, and so Williamsburgh's turn will soon be reached. Notice Grand Street on the map. All streets north of Grand Street are called North, i.e. North First, North Second, etc. Those south of Grand Street are South First, South Second, etc. The cross streets are just numbered. There are eleven of them and then comes Union Avenue beyond which there is an almost exclusive German settlement, popularly called Dutch village. Here the inhabitants are

chiefly working men, most of whom work in the city. When they go to New York, they go either down Grand Street to one of the two ferries, or they go down South 4th Street to South 7th to the Peck Slip ferry. Most of them take the latter route. That is why I rented the place on South 4th Street. It is between 7th and 8th Streets, so it is near Dutch village, and also near 5th Street, where the homes of the fashionable world begin and extend to the river. You must not regard the working class as like that in Europe. A good worker, for instance a tailor, earns about $30 a month; food is cheap and soon he can save enough to buy a cheap lot in the environs of New York for about $300 to $400. On this he builds himself a nice frame house for another $400. As the years roll on he becomes well-to-do, starts his own business, and by the time his house needs a new coat of paint or important repairs he is rich enough to tear it down and replace it with a three-story brick house. A physician who is dependent on this class prospers with them. The safest way to gain a secure future is to develop with a growing city. . . . There are many square blocks that are not built up, or at most have a lonely frame house on them, cattle graze on the land, and the only indication of the street is the street sign bearing its name. A year later all evidences of the former primitive state are gone except for the unpaved street and the pigs promenading on it. I had great difficulty finding a suitable home. Just because most of the houses here are owned by families who built them for themselves, it is difficult to find space to rent. Moreover, May 1st is moving day and leases are signed for a whole year. It took me several days to find this house. It is a three-story brick house. An American family occupies the second story and the rear basement room. I have the front basement room, the first floor and a room on the third floor. The rent is ten dollars a month, very cheap. I must first describe to you an American house. Most of them have the same width, depth, and construction. The lots are 100 feet deep, and 25 feet wide. Thus the front is 25 feet wide, the depth of the house about 40 feet, and behind it is a yard, separated from the adjacent yards by a board fence. . . . Even among people in modest circumstances, the rooms are beautifully carpeted and a rocking chair is never missing. In these chairs the ladies rock and carry out the chief occupation of their lives, namely getting one year older in 365 days. I shall use the front parlor as my office and shall live in the back room. If I can board with the family all the better, if not I shall have to do my own housekeeping or get a man who can direct

patients when I am away. One can get a cook who will take care of the house and washing as well for $5 to $6 a month. My laundry would cost almost as much if I sent it out—the price is 6 cents a piece no matter what it is. Food for myself and my man would cost 75 cents a day if we eat out; if we eat in not more than 50 cents. One can live here decently for $500 to $600 a year, and I certainly will earn that easily in the first year. W. and his wife eat simply but plentifully. Their rent is $8 a month, and the rest of their expenses $2 a week, so their yearly budget is about $200. Of course, they have no maid and Mrs. W. does the laundry. The most expensive items here are clothing, underwear, and laundry.

The railroads are a bit strange to a European. The railroad stations in the large cities are usually only wooden barracks. This is in accord with the spirit of the American who in his enterprises confines himself to necessities, figuring that beauty can be added later. The railroad stations are in the center of the cities, and the rails run through the streets. When the train passes, it goes a bit more slowly and a bell is rung. This seems quite sensible to me, and accidents are rare. Sometimes there are accidents in the open country if a cow or a whole herd of cows stand on the rails. No engineer stops the train because of this. A cowcatcher, attached to the front of the locomotive, roughly shovels the stupid beasts to one side. Sometimes, however, they get under the wheels and if there are too many the train may get off the track and turn over, killing a few people. In the newspapers one then reads of a "melancholy accident" and then everything is all right again. The rails are not well laid, and often metal splinters a foot long are broken off of them so that only the narrowest strip supports the wheels rolling over them. The cars are not as luxurious as in Europe and for the most part only one class. The trains are fast. It is 96 miles from New York to Philadelphia. Although one must change from the car to a steamer twice, and although one of these steamer crossings takes one hour the whole trip takes only four and one-half hours. The railroad fare to Philadelphia is three dollars. . . . As far as having dirty streets is concerned, New York can boldly enter into rivalry with the dirtiest Italian cities. Although the sidewalks are good the street is either unpaved or very badly paved. Since there are no sewers, all the dirt and offal are thrown on the street and poison the air. The city pays $150,000 for street cleaning. In Boston, the city gets a sizable revenue by selling the filth of the streets. . . .

The hotels in the United States are magnificent, many can accommodate three hundred or more guests. In the fashionable spas like Saratoga there are hotels with a capacity of seven hundred. The hotel is divided into two sections, one for gentlemen, the other for ladies. The separation is not absolute, but only friends are allowed in the ladies section, others must be introduced. At the noon day meal, the sexes are completely separated. The waiters are for the most part colored. One steps from the street onto a porch where the gentlemen loaf around all day on chairs with their heels directed toward heaven. From here one goes into the hall from which parlors go off. Then comes the barroom. The American can take his refreshment only standing. He drinks for the most part soda water with sarsaparilla syrup or brandy and water. Here one may smoke, but nowhere else in the building. But to compensate for this one sees spittoons everywhere. From the barroom one goes into the huge dining room, where for instance in Jones Hotel in Philadelphia, three hundred people eat daily. A printed bill of fare is at every place. There are some forty dishes and these all sit on the table and are kept warm with alcohol lamps. Soup and fish are passed around. Then one hears the head waiter give a hissing sound and in rhythmic unison each waiter grabs a dish cover and holds it high like a cymbal. Still holding the covers high, all of the waiters move to the back of the dining room and simultaneously place the covers on a table. Now all the wonders of the kitchen are unfolded and a waiter asks the guest what he wishes. Breakfast is a very substantial meal, one gets tea or coffee and various meat dishes. At six o'clock again tea and meat dishes and from nine to midnight one can have tea and the greatest variety of cold cuts. To call people to dinner they use a huge gong that makes a terrific noise; a bell would not be heard in these large buildings. The rooms are very small and very simply furnished, for the traveling Yankee never stays in his room, but makes his headquarters in the parlor where he receives friends, writes letters, and in short does everything that we would do in the privacy of our rooms. The charges in first class hotels are two dollars a day, everything included. On the day before my departure for Philadelphia, there was a huge fire that destroyed four hundred houses and killed fifty people. There is nothing commoner in the United States than fires. In New York there are about two fires a day. They form the chief, and one may say the only national amusement of Americans. The fire fighting is excellent. Each district has its volunteer fire companies. After six years'

service these volunteers are relieved of militia and jury duty. Their bravery and recklessness are proverbial. As soon as the fire bell rings everyone runs to the fire house. There are two long ropes attached to the front of the fire engine. Whoever happens along grabs the rope and so one often sees fifty to sixty men running, pulling the engine to the disaster. The wagon with the leather hose is drawn the same way. Since all streets have water mains the hose is connected with the main and the pumping goes ahead uninterruptedly. But now the other side of the picture. There is no attempt to keep curious spectators from the field of conflagration; on the contrary, where the fire is hottest there it is most crowded. Many spectators are killed by falling beams or walls. But this deters no one, for no Yankee can resist the magic attraction to watch a fire from close-by. The firemen expose themselves to unnecessary dangers, and every man is proud to be the last to leave a burning house. Jealousy between fire companies often leads to bloody or fatal fights even during a fire or on the way home. Many Europeans would despair about the inefficient police that permit such things. But here one knows the limits of legislative power too well to make laws that cannot be enforced. The people have to have the desire for a law before the legislature enacts it, in contrast to Europe where orders and decrees come over night from a deus ex machina. The same chap who fights for his fire engine company volunteers when his fatherland calls him to a greater duty. Such were the six thousand who in the recent Mexican war dictated a peace to a people of eight million souls. If it were not for such men who risk their lives for a trifle, California would not have gained two hundred thousand inhabitants in two years and San Francisco would not have grown to a city of fifty thousand in the same time.

Williamsburgh, September 22, 1850

I have now been in practice for one month and I can be well satisfied. In Steyr where I settled with exceptional recommendations and a good name, I earned 5 Fl. in the first month. Here where I started quite unknown, my first month brought me $18. And I earned this in the first three weeks, for with this month, the healthy season begins and I have seen no patient in a week. The summer diarrheas, particularly among children, disappear as soon as the hot spell is broken. So I had only the tail end of this. Fortunately, I cured four very sick children in a short time and this has given me a good reputation. I have the rare

advantage of Dr. Gescheidt's introduction to a number of families. Four have already promised to call me if they need a doctor. Such a promise from a Yankee means much more here than in Europe. It is never an empty polite gesture. I have already experienced that. When I was introduced to Mr. Hooper he said, "It is enough that you recommend the doctor." The next day his sister-in-law came to see me, and two days later I was called to see the wife of a wealthy German merchant to whom Hooper had recommended me. Another man who was asked to recommend me said that he knew American doctors who had his complete confidence. When he was then asked to take a few of my cards he refused, for he said that if he actually took my cards he would then have to recommend me. Is that not done more honestly than in Europe?

I have a patient in New York whose cure will be of great value to me. I sewed up a cleft palate of a young man. This is the most difficult operation in all surgery and is successful in only half the cases. But in this case, I was completely successful. I shall publish it in a medical journal. Were the man well to do, he would gladly have paid me two hundred dollars, but since he is in moderate circumstances and fought bravely in Vienna, I charged him nothing.

I have had great difficulty in finding a servant, so for the first two weeks I made my bed, swept the house, polished my shoes, bought bread, butter, and cheese, and at twilight sneaked to the well with my pail to draw water. Now I have a couple, brother and sister. I rise at 6 in the morning, make my own coffee. I have office hours from 7 to 9, then I pay calls if I have any. I go to New York for my noon day meal since there are no suitable restaurants here. I am usually home again at 2 P.M. and after this rarely leave my rooms. I try to relieve my loneliness by reading English books and medical works. I make my own tea in the evenings and have bread and cheese or eggs. I have bought 6 dozen bottles of wine. French wines are very cheap—twelve cents a bottle. . . .

They are talking of consolidating New York, Williamsburgh, and Brooklyn into one city. The chief advantage would be that a branch of the remarkable Croton water system would be brought under the river to Williamsburgh and Brooklyn. Croton water is not good drinking water, but that makes no difference for we have good well water. Croton water, which is led through pipes to all stories of every house, is used for cooking, washing, and bathing. In New York every house has a bathroom. One just turns a faucet and the water runs into the tub, and

the dirty water then runs off through another pipe. So one can bathe as often as one wants without any effort. . . .

At present Jenny Lind is here and has thrown the Americans in a frenzy the like of which I have not seen, even in Vienna. The newspapers are full of detailed accounts of everything she has done and has not done since boarding the Atlantic in Liverpool—even the degree and duration of her seasickness. The Nightingale, for she has no other name, cannot appear on the street or visit a store without thousands of people gathering around her and giving three hearty cheers, which are duly recorded in the newspapers with great satisfaction. I believe she has received at least three shiploads of flowers. On the day after her arrival the mayor of the city visited her. The Catholic bishop came, too. Jenny donated the $10,000 that she earned on her first evening to charitable organizations. She gave $5000 to the welfare fund of the volunteer firemen, and I believe that these devils would like nothing better than if the whole Hotel New York were in flames that they might sacrifice a dozen lives to save their Jenny. Lind has contracted to give 150 concerts for which she is to receive $150,000 and half of the net income from each concert which amounts to six to eight thousand dollars. Tickets for the first concert were auctioned off in Castle Garden. A hat manufacturer bought the first one for $225. The newspapers immediately figured out that he had done a very good business, for his name now is blazoned in all the newspapers of the Union, which would have cost him at least $5000 in paid advertisements. Now tickets are selling for from one to six dollars and seven to eight thousand persons are present at each concert. The Nightingale has put General Paetz and Garibaldi completely in the shade. Even the Turkish ambassador, Amin Bey, did not receive the attention that she does. But even so thousands turned out when he was put on show. It is customary here for every important personage, native or foreign, to receive the public for five to six hours in the city hall. Both the fashionable world and the working classes crowd in to shake hands with the celebrity. When a President appears outside of Washington he is really a martyr, because for him one day's handshaking is not enough. I am astonished that the President's arm has never remained in the hand of some faithful Yankee, for they take their handshaking very seriously. . . .

The fruit is wonderful, especially the peaches. The best ones cost a cent a piece, and if you buy them by the basket, only half as much. During the past three weeks seventy to eighty thousand baskets have

come to New York daily. Every good Yankee eats twelve to twenty peaches a day and one hardly meets anyone who, even in the midst of money-making, is not eating a peach or carrying a melon.

I estimate the cost of housekeeping is about twice what it is in Austria. But one must consider that every prescription costs 25 to 50 cents, no home visit under 50 cents, in better homes a dollar. It is true that some do not pay their bills, but by and large the public is much more conscientious about paying doctors than it is in Austria.

Williamsburgh, October 8, 1850

The mattress that I have had made here is 4 feet wide, 6 feet long and 7 inches high and contains 35 pounds of horsehair and costs $15. Cooking utensils here are excellent. They are made of sturdy porcelain glazed white. A wash basin, soap dish, and tooth-brush dish cost $1.50, a tea pot $1.00, a sugar bowl 85 cents, a half-dozen coffee cups 75 cents, 6 dinner plates 50 cents, 6 dessert plates 38 cents, 6 drinking glasses $1, 6 wine glasses $1.50. . . .

You should take a steamer, not a sailing vessel for your trip over here. You can leave from Liverpool, Havre or Bremen. The Liverpool ships are the fastest and best; they take 11 days. The fare is $150. The fare from Bremen is the same; the trip takes 18 days because they have to stop at Southampton for two or three days. . . .

I now can read the newspapers as readily as German and need rarely look up a word. But I still have far too little contact with Americans to hear much English and to speak it enough. But my patients understand me well, and I understand them. My practice has resulted as follows—August (only 8 days), $3.25; September, $10.50; October 1 to 7, $3.00. I have $22 more on the books which is good. I have seen 18 patients in their homes, and 12 in my office. I have been called to 2 farmers, who live an hour's ride from here. The patient with the cleft palate whom I operated on has given me much annoyance. In spite of my injunctions, he visited his family eight days after the operation, talked a lot, and yawned before going to bed. So one-third of the suture line gave way. He will now have to have a secondary operation. . . .

It will not be long before steamers will displace sailing vessels between Europe and America. Now that they have laid a cable between Ireland and England, and the mail boats will undoubtedly stop at Galway, we can have news from Vienna spread all over the Union in eight days.

Once that has been achieved, it will be much too slow for the Yankee, and a company will be organized at once to lay a cable between the Irish and American shores. I have not the slightest doubt that such a cable will be in operation within five years. One can make wires that are as long as the ocean is wide and there is plenty of gutta-percha to insulate them, so the chief difficulties are already overcome. How astonishing if we were then to receive news of European events before they have happened. Today telegraphic news from the West arrives half an hour to an hour before the time it was sent off. The telegraph operates so efficiently here that the earth turns more slowly about its axis than the time it takes to send telegrams of four columns of news one thousand miles. That all comes from competition that makes the telegraph so cheap. The state concerns itself as little as possible with these tremendous utilities and leaves them to the ingenuity of private enterprise. Thus there is no monopoly. If anyone today starts a successful business he has ten licenses for his patents tomorrow. Then prices drop and both public and sellers benefit. There is no newspaper here that does not daily carry a full page of telegraphic news. People in Europe can form no idea of the nature of newspapers here. I doubt whether there are more than three to four hundred newspapers in Germany. Here there are three thousand. In Germany the most widely read paper is the *Kölnische Zeitung* which has two thousand readers. The larger journals here have fifty to seventy thousand readers. This is a clear measure of the degree of participation of the people in public affairs. When knowledge of public matters penetrates all groups of the population, nothing can be done that is against the will of the people. The European statesmen believe that because children cannot walk alone, and bent old men hobble along with a cane, man should walk on crutches all his life. Here one hurries as fast as possible to take off the babies' shoes. There is no such thing as treason here. The newspapers of the South daily preach separation from the Union, and their screeching has not yet given any lawyer a quarter of an hour's work. In them, one sees the old spirit of Jefferson for whose statement "resistance against tyrants is obedience to God" one would be thrice hanged in Europe. Although the newspapers are much more alive and less stuffy than in Europe, when they leave the bounds of politics and enter the fields of science or the arts, one would wish that the editors had more education. One observes that they gained their education in the school of life, that since

their boyhood they have sharpened their powers of observation and judgment in the strife of daily politics. . . .

A year ago today we lost Leopoldstadt and the Landstrasse. Thus democracy succumbed in Vienna, and yet as a reward for this fight, I am enjoying a democracy that would be impossible in Europe. I have been here just four months and feel so at home and contented, more than I ever could have in Europe. I wish I could instill into those who are dear to me just a small part of the love I have for my new fatherland, so that they would decide to come over here.

My practice to date has brought in $24.50 cash; $47.50 on the books. My cash income is becoming relatively less, for the more well-to-do do not pay their bills before New Year's. I am much pleased that I have been adopted as family physician by two Yankee families.

Williamsburgh, November 19, 1850

Who gave you the idea that the drinking water is bad here? We have the best well water. Everyone here has fireplaces, but in the winter they put up iron stoves that are very attractive and useful. My parlors are completely carpeted. This custom involves the greatest expense in fixing up a home. I bought only very thin carpet which cost fifty cents a yard. Usually one cannot get it under a dollar a yard. . . .

I shall publish my operation on the man with a cleft palate in a medical journal. I have already sent some papers to the *North American Monthly,* and have several under way. I would not think of having anything appear in the newspapers. This is a filthy indecent method, used by quacks of all sorts. I write scientific papers because I enjoy it, and because I still have material from my former position in Vienna. It is unlikely that this will bring me much recognition, for one can hardly speak of the science of medicine here. Incidently, the little scientific material that I brought along from Vienna will soon be used up. Then I, too, will jog along at the pace of a country doctor. I have too great a regard for science to remain in her service after I have been cut off from all means of prosecuting my studies. Undoubtedly, I could have achieved something worth while if I had not been uprooted from my original career. But that can no longer be changed, and memory of my loss causes only a transient depression. I have never been very ambitious and unless one is a genius, one's services to science can easily be replaced by someone else.

Williamsburgh, December 23, 1850

My grate fire in the fireplace is very satisfactory. Every evening I give myself the pleasure of relaxing in a most comfortable position, a cigar in my mouth, and gazing and spitting into the fire, as is proper for a true Yankee. . . . Recently I heard a performance of the *Creation* by the New York Music Society. It was very good. A few days ago the New York Art Union held an exhibition of the art works it had bought during the year. There were one thousand works of art. It is true, most of it is trash, but there are some good ones among them. It is the only way to develop art here. We have no kings who can rob the people for the benefit of the artists. Art too must become democratic. It is lost if it seeks an individual patron. The people must nourish it vigorously and seriously. A proof is that the Art Union has eighty thousand members, each of whom pays five dollars annually. Painters who are not of the first class, who would starve in Europe, could live well here if they could get themselves to get over their snobbishness which hardly permits anyone to see their works. Nothing is punished here more severely than proud reserve and despising public opinion, which after all is always right in the end. . . .

. . . My practice to date has brought in $109.50 cash, on the books (certain $89.25, doubtful $36.75). Between now and New Year's, I shall take in about $30. So we can now draw conclusions about our future. If I have been able to earn $200 in the first two months it certainly is not an exaggeration to assume that my income for 1851 will be about $600. With that amount of money a small family can live very decently. I will give you an example. A certain lady in Brooklyn has no income except what she receives from 4 boarders. Each boarder pays $4.00 a week for which he gets a nice room and good food. Thus her income is $832. Out of this she pays $350 rent, and the remaining $482 are enough to feed 5 people well, keep a maid, and provide her with clothing and whatever else she needs. You can figure from this what it will cost us. A cook, who also does housework and sleeps in gets $8.00 a month; 5 tons of coal cost about $25.00, kindling wood $15.00; monthly housekeeping expenses figured high would be $40.00. Thus if we estimate an annual income of $800, and subtract these main items, it leaves about $180 for rent. Of course we shall have to be modest in our demands and cannot rent a whole house. . . . Every doctor has to have a gas light on the street in front of his house and this costs $20 a year. We shall have

to get along without a piano at first; one cannot get a good one under $300. . . .

Williamsburgh, January 18, 1851

I delivered all of my New Years' greetings in the most proper form. But my legs were weary for I started at nine in the morning and finished at seven at night. I paid between thirty and forty visits. On this day the streets have a unique appearance. No woman is visible; all are sitting at home expecting the visits of the gentlemen. The streets teem with men dressed up to kill who, with the greatest of haste, dash in and out of houses. Sometimes they collide while reading their yard long lists of addresses of homes they still have to visit. The women must sit in the parlor from morning to midnight, and wish every one a happy New Year, and join in a toast to their health. In every house tables in the back parlor are laden with sweets, cold cuts, port wine, Madeira, and brandy. One must take something to eat and drink in every home. The temperance adherents are in despair on this day. I was quite affected by an article in the *Tribune* by philosopher Greeley, who insisted that whoever allowed himself to be tempted on this day to drink such awful poison would become a drunkard. I rather like these New Year's customs. One is not obliged to stay longer than five minutes. Nothing gives greater offense than to omit the New Year's visit. The family physician will surely lose the family if he has not personally wished the lady of the house a happy New Year. . . .

On Christmas day, I visited a Viennese on a farm eight miles beyond Newark. The farmer is really the only independent person in the world, and only when one meets the American farmer and observes the simplicity of his customs, which has nothing to do with his education, can one do justice to the solid foundations on which American freedom is based. There are no better wives, mothers and housekeepers than American women of the middle classes. Just because they do not poke around the house all day, fighting with the maids, etc. the superficial observer might imagine that they do nothing. In all of Centreville and Caldwell, there are no poor people and also no real servants. The wife and daughters wash, clean, scrub, cook, clean the stable, milk the cows, but they work so fast that they are done at eleven or twelve o'clock, and put on their good clothes and sit in the parlor. There is a piano in every parlor, which it is true they do not play very well. It is the great good fortune of the

Union, that because of the equality of all people there are no classes with special customs, with sharply different modes of thought and feeling. The European peasant remains a stranger to the middle classes who never learn to understand him. In America, although a man's occupation leaves its impress upon him, the basic direction of the thoughts and feelings of all citizens is the same. The doors of most farms stand open even when no one is home. In the use of farm implements and animals there is a true communism. A farmer goes to his neighbor and asks whether he is going to use his oxen today. If he says no, it does not occur to him to ask permission to use them, he just goes to the stable and harnesses them. If no one is at home except the oxen he just takes them because he figures that they would not be standing in the stable if they were going to be used. The owner does not bother about it and often finds his oxen in the morning without knowing who had them out, and without deeming it worth while to find out. D. tells me that on occasions when he reads to his family at night the neighbors drop in. He keeps on reading, the neighbors go to the fireplace, spit into it for a while, and leave after a few hours, often without his knowing they have left. Because of this absence of all formality, the Yankee is often accused of being without sensitivity, but it is only an expression of self-government that has become part and parcel of them; everyone does what he will and lets others do likewise.

[In 1857, Krackowizer moved to New York at 49 Amity Street. His wife went abroad in 1860 and the following are from letters he wrote at that time.]

New York, June 1, 1860

You will learn the news from the weekly *Tribune* which I am mailing to you. I am very glad about the nomination of Abraham Lincoln as candidate of the Republican Party for the presidency. Two years ago, I began to regard him as one of the outstanding men, and I actually clipped from the newspaper and saved one of his speeches in the debate with Douglas for the senatorship—a thing I have done only twice since the Fremont campaign. The other clipping was the short, simple and noble speech of old John Brown in the court house at Charleston, Va. after he had been condemned to death. Do not fear that the old restlessness will drive me into the political arena again. I vote for Lincoln as a man,

because I have faith in him, and I despise the Republican Party as an organization as well as the Democratic Party. . . .

Our expenses for May, including life insurance, totaled $348. Income from practice was $293, and rental of the house in Williamsburgh $103. We now have $200 in the bank. H. M. has finally died. My bill will be between $60 and $100. He might have saved himself that expense if he had had the courage to recognize that for dying one doctor is enough.

It is quite probable that I shall go to New Haven for two days. The Academy of Medicine has chosen me as a delegate. I refused, but Drs. Watson and Batchelder urged me to go and since they want me to give a report on tracheotomy for croup, I can hardly withdraw. If I go I assume a heavy task, because I will then be charged with preparing a comprehensive report for the *Transactions* of the National Medical Association for 1861. Perhaps it is as well if I must, else I would not get around to it.

New York, June 15, 1860

The girl about whom Herzog consulted me had to be operated on, but unfortunately did not survive the operation for more than 24 hours. Had the operation been successful I could easily have charged $300, for the parents are very well-to-do. As it is, I shall not charge more than $100. I enclose a clipping of a Jewish newspaper. The article is written by the president of the Jewish Hospital [Mt. Sinai Hospital]. Many Jews whom I have seen are very proud that they have such a hospital and such a surgeon. Without doubt this "blowing" will be useful to me. I had the devil's own time to prevent the president from sending this news item to the regular newspapers. . . .

I shall have to work hard evenings for the next two weeks, for I promised Dr. James R. Wood to present a report before the next meeting of the surgical section of the Academy of Medicine on all known cases of infection of the knee joint. . . .

The night after my return from New Haven I had two deliveries. A woman from Mexico consulted me about her crippled child. She is taking it to Berlin and wanted me to write her an opinion that she could take to Meyer, Romberg, Eulenburg, and Langenbeck. I charged her $25 which she paid with the greatest pleasure.

I forgot to tell you that in New Haven I saw Cook's carriage factory—the largest in the United States. The machinery is remarkable,

and enables them to make four thousand carriages a year, or on the average of one every hour. . . .

Tomorrow I have to go to Rockaway to see a patient. I leave the house at 9 a.m. and will be back at 4 p.m. My fee will be $25.

New York, August 10, 1860

Jacobi sends you his best regards. On the occasion of the reorganization of the New York Medical College he was offered the professorship of pediatrics and I was offered the chair of pathological anatomy. But we declined, because we believe the undertaking is not built on solid ground, will demand financial sacrifices, and will be unsuccessful in spite of everything. Also Dr. R., a notorious person, is on the faculty, and one should do all one can to avoid him. You see how proud one can be to throw away professorships. If the people abroad knew the differences between professorships and professorships. . . .

New York, August 24, 1860

Jacobi has accepted the professorship of pediatrics after all. His chief reason was to establish a precedent, no matter what may become of the medical school, and so to force the medical colleges of the country to incorporate pediatrics into their curriculum. He is quite right in this, and it depends on his talent for teaching whether he will be in demand as lecturer in diseases of children, even if the reorganization of the institution fails.

All of us doctors have very little to do. Were it not for quite a few consultations, and a steadily growing office practice, things would be pretty bad. In the past fortnight I had three deliveries.

The Downs and Ups of Anson Jones, M.D.

T. WOOD CLARKE*

IN THE YEAR 1798, near the village of Great Barrington in the picturesque but sterile Housatonic Valley, frowned on by the heights of the Berkshires, there was born a boy who would appear to have been fated from the start to be unfortunate. Not only was he number thirteen of fourteen children but he was physically a weakling, psychologically timid, and cursed with an inferiority complex. His name was Anson Jones.

Anson Jones had fine blood in his veins for he was descended from William Jones, "Deputy Governor of New Haven and Connecticut" from 1683 to 1698, who was the son of Colonel Sir John Jones and the nephew of Oliver Cromwell. In spite of his ancestry, however, Anson was brought up in dire poverty. His father, Solomon Jones, had been left an orphan at the age of seven and reached manhood during the disturbed days of the American Revolution. With no financial backing he became a tenant farmer, and, during Anson's youth, lived on ten different farms in Berkshire County.

The first eighteen years of Anson's life were spent in helping his father on the farm, attending school at intervals and spending what little spare time he had in poring over any book on which he could lay his hands. In this way, though his actual schooling was meager, he managed to acquire a familiarity with English literature and a fair knowledge of Greek, Latin, and mathematics.

When the War of 1812 broke out Anson, though only fourteen years of age, wanted to enlist but his father, a veteran of the American Revolution, entered the boy in the Lenox Academy and he himself joined the army.

On his mother's death, when the boy was eighteen years of age, and the resultant breaking up of the household, his father and three elder sisters, apparently without considering his wishes in the least, for he

* The author wishes to acknowledge his debt to Mr. Herbert Gambrell, Director of the Dallas Historical Society, Dallas, Texas, who first aroused his interest in the subject. Mr. Gambrell has just published a biography of Dr. Jones, *Anson Jones: the last president of Texas.* New York, Doubleday & Co., 1948.

This article was awarded first prize for a biography by The American Physicians' Literary Guild at San Francisco, June 1946.

had set his heart on being a printer and thus having free access to many books, decreed that he was not strong enough for a farmer and must study to be a physician. Though completely disinterested in the subject he accepted the dictum docilely and began his medical studies in the office of Dr. Sheldon of Litchfield.

The study of medicine in those days was very different from what it is today. No preliminary education was required, and attendance at a medical school was considered a luxury rather than a necessary part of a physician's education. The common procedure was for a youth to enter a physician's office where he usually remained for three years. While there he swept out the office, cleaned the instruments, kept the accounts, cared for and drove the doctor's horse, assisted his preceptor in operations, compounded his drugs, read his textbooks, and occasionally went with him into a patient's home to see an interesting case. After three years of this he would, if he had his preceptor's recommendation, appear before three members of the Board of Censors of the County Medical Society, be examined by them, and, if successful in the examination, receive a license to practise medicine and surgery. If he could afford the extra expense and wished to be able to put the initials M.D. after his name he would attend a medical school where, after two terms usually of six to eight weeks each of intensive lectures, an examination and a thesis, he would be awarded the coveted degree.

After one year in Dr. Sheldon's office his slow progress and his mounting debts forced Anson to abandon his studies and take up teaching in a school in Goshen. He continued, however, to read any medical books he could borrow.

His next move was to the village of Utica, N. Y. Here, in 1818, he joined his brother, William, who, after spending three years working in a saddler's shop, had opened a small grocery store. In this store Anson worked as a clerk to earn his board and lodging and again took up his medical studies, this time under Dr. Amos G. Hull, who had been the first president of the Medical Society of the County of Oneida in 1806, and had recently been re-elected to the same office.

Again debt forced him to give up his studies and return to teaching. On his return to Utica he found that the grocery store was so unsuccessful as not to warrant a clerk while his brother's financial condition precluded his giving Anson either board or lodging. By this time Anson had set his heart on making a physician of himself, and so he arranged

with a friend, John Edward Hinman, to board him on credit. Hinman, who was deputy sheriff of Oneida County, had been a soldier in the War of 1812, rose later to the rank of colonel, was a vestryman of Trinity Church, and, in 1850, became mayor of Utica for three terms.

Anson resumed his studies under Dr. Hull, one of the most vigorous physicians of his time, who added to his income by conducting a store for the sale of mineral waters, and manufactured and sold a hernial truss he had invented and advertised freely in the newspapers. For this truss he received official commendation from the County Medical Society and the Fairfield Medical College. On September 5, 1820, Anson Jones appeared before the Board of Censors of the Medical Society of the County of Oneida, of which his preceptor was president, was examined and awarded a license to practise "physic and surgery."

As Utica was at this time overstocked with physicians of high repute and young Jones was again deeply in debt, he felt that he must make his start in a smaller community and went to Bainbridge, Chenango County, where he hung out his shingle, sharing an office with a young lawyer. This was an unfortunate choice for Bainbridge had a popular older physician who had a monopoly on the practice of the village and the countryside. The timid Jones, young, looking younger than he really was, had no chance. After a year's earnest effort, more heavily burdened by debt than ever, he gave up in despair and moved to the neighboring village of Norwich.

As he had been able through the influence of Dr. Hull to establish credit with a pharmaceutical house in New York City, Jones opened a drugstore in Norwich and was looking hopefully ahead to establishing a medical practice also. The drugstore quickly became a success, Jones visioned prosperity, respectability, and freedom from financial worries. His bubble, however, soon burst, for no sooner did his store begin to make a little money for him, than his supposed friend in Utica, Colonel Hinman, who had now become sheriff of the county, got out a judgment against him for his old board bill. With his stock of goods seized by the sheriff of Chenango County, Jones was again stranded and deeply in debt to his New York creditors, while his local business reputation was ruined.

Desirous of getting away from New York State, where luck had been so against him, and starting anew in fresh fields, he headed for Harper's Ferry, Va. He had, however, gone only as far as Philadelphia when he was again overtaken by the law and was arrested for his debt to his

New York creditors. To satisfy these demands he surrendered a watch and all the money he had except twenty dollars.

Reaching Harper's Ferry was now out of the question and his only choice to remain in the City of Brotherly Love, he promptly hired an office and hung out his shingle. When patients failed to appear at the consulting room of the unknown and timid young man, he again abandoned his profession and took a position as a teacher. Teaching, however, soon palled on him, and when, six months later, he learned in some way, probably by reading an advertisement, that there was need of an American physician in Caracas, Venezuela, he resigned his school position and took ship for South America. In this country, newly liberated from Spain by Simon Bolivar, he met with immediate success. In two years he had paid up his debts and saved enough money so that he felt justified in returning to his native land.

Landing in Philadelphia, in 1826, with the self-confidence generated by success, he again rented an office and at the same time, well aware of the limitations of his medical knowledge, matriculated in the newly organized Jefferson Medical College. Here, in March 1827, he received the degree of Doctor of Medicine and now could devote his entire energy to building up a practice. He decided that to do this he must broaden his circle of acquaintances and become a "joiner." In his lodge life he was eminently successful and became so popular that after five years he had been elected Worshipful Master of a Masonic lodge and State Grand Master of the Odd Fellows. He devoted a tremendous amount of energy to both organizations, founding new lodges, directing the building of new halls, and generally showing such whirlwind activity and assiduity in promoting the interests of the societies that he became well known and highly respected in fraternal circles throughout the State of Pennsylvania.

But in spite of his many friends and great popularity the expected practice failed to materialize. His brethren would allow him to work himself to a state of exhaustion for the honor of their lodges, but they would not come to his office as patients. Each year his expenses topped his income, while his small stock of gold brought from South America gradually faded away and by 1832 had disappeared.

When, therefore, in the fall of 1832 a Mr. Spear, a merchant of Philadelphia, asked him to join him in opening a mercantile establishment in New Orleans the discouraged physician accepted the offer, gave up his profession, resigned from his fraternal responsibilities, closed his office,

and sailed for the Louisiana city. Here, however, misfortune again followed him. They had barely established their business when both cholera and yellow fever broke out in the city.

The citizens of New Orleans were used to yellow fever and took it more or less in their stride as did the Cubans in Havana. In fact a large percentage of the people had had the disease and therefore was immune. When Asiatic cholera appeared, however, the city was seized with panic.

> News of the arrival of the cholera spread like wildfire through the city, creating panic everywhere. Families hurriedly put a few of their possessions into their carriages and started for the open country; others crowded the wharves, scrambling like madmen for places on the river boats: "that day (October 25) as many persons left the city as could find means of transportation."
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> Within two days the new epidemic had swept into every section of the city, and by November 6 "all the physicians judged that, at the lowest computation, there were five thousand deaths—an average of five hundred a day." Women crowded old Saint Louis Cathedral, praying for relief; a score of priests and one Protestant minister offered the dying such comfort as religion could bring; and the few men who hurried through the business streets wore wide bands of black crepe on their arms. "All stores, banks, and places of business were closed. There were no means, no instruments for carrying on the ordinary affairs of business; for all the drays, carts, carriages, hand and common wheelbarrows, as well as hearses, were employed in the transportation of corpses."
>
> The population of New Orleans had been about fifty thousand in September 1832; but after the epidemic commenced to spread its destruction that month, probably fifteen thousand of the inhabitants fled the city. "During the entire epidemic, at least six thousand persons perished; showing the frightful loss of one-sixth of the people in twelve days. This is the most appalling instance of mortality known to have happened in any part of the world, ancient or modern."

Not only was all business at a standstill, but Dr. Jones' partner turned out to be a rascal and disappeared with the assets of the company. Dr. Jones' obvious course, with two great epidemics raging and the doctors driven day and night, was again to hang out his shingle. This he did, but no sooner had he developed an active practice than he contracted yellow fever himself and was incapacitated for many months. By the time he had recovered both epidemics had subsided, while his practice and his money were gone. In his discouragement he turned to drink and to gambling.

In his memoirs he speaks of this episode in these words:

> I found the pernicious habit of gambling, to which I always had inclination, was growing upon me there. Before going to New Orleans, it is true, I had never indulged the inclination to any extent, but there the constant temptation thrown

in my way I found was slowly overcoming my resolutions not to indulge this propensity.

Whilst in this place, also, partly from having frequently little else to do and partly to overcome the feelings of disappointments I had so often endured, and more particularly about this time, I also found myself learning to imitate the fashionable practice of taking a "julep" much oftener than was at all necessary.

Both of these practices I most cordially despised, it is true, but notwithstanding the facts are as I have stated. I therefore felt anxious to get away from the place and its associations.

It was not long before he recognized the fact that, if he remained in New Orleans, he would soon be in the gutter. When the captain of a coastal ship told him that in Texas, then a part of Mexico, there was an ever-increasing number of settlers from the United States, a great deal of illness and an almost total lack of physicians, he engaged passage on his ship and started for Texas.

When Dr. Jones arrived at the mouth of the Brazos River in October 1833 and made his way inland to Brazoria, lauded as one of the most flourishing mercantile centers in Texas, with seventeen dollars in his pocket and fifty dollars worth of drugs in his bag, he was disheartened indeed. Brazoria was a settlement of fifty families, dirty, disease-ridden and commerically dead, for the cholera had but recently ravaged this town also. But he hated to return to New Orleans and his old environment and had no money to go farther, so he remained in Brazoria and his climb to fame began. He was at once accepted as an important member of the community and soon developed an extensive practice.

In this fall of 1833 the revolution of the Texans against Mexico was approaching rapidly. Four months after Jones' arrival Austin was thrown into prison by Santa Anna, then busy making himself dictator of Mexico. Clash after clash occurred between the Mexican government and the settlers in Texas. Finally, on November 3, 1835 a general convention, called "The Consultation," was held at San Felipe at which a provisional government was formed, Henry Smith elected governor, and Sam Houston commissioned major-general of the armies of Texas. Dr. Jones was the representative of Brazoria at the "Consultation." The revolution which resulted from the convention was at first intended simply to right the wrongs of the settlers in Texas, sorely oppressed by the dictator, Santa Anna, and to bring about the division of the state of Coahuila–Texas and make Texas a separate state of the Mexican republic with a governor of its own. Anson Jones from the first advocated complete independence

for Texas. When, however, a Mexican army invaded Texas and Santa Anna brutally slaughtered men, women and children at the Alamo, desire for freedom swept the country so that on March 2, 1836 the provisional government issued a Declaration of Independence and elected David G. Burnet president. When actual hostilities broke out Jones took an active part in the war, was appointed regimental surgeon, and soon afterwards assistant surgeon-general and medical purveyor of the army. In the terrible battle of Jacinto on April 21, 1836 when Houston defeated the Mexican army, outnumbering his nearly two to one, and made Santa Anna a prisoner, Jones grabbed a rifle and fought in the ranks.

The capture of Santa Anna led quickly to the withdrawal of Mexican troops and the end of Mexican rule north of the Rio Grande. The Republic of Texas was a fact. Anson Jones was elected a member of Texas' first Congress.

When Sam Houston became president of Texas in October 1836, he appointed Dr. Jones the minister of the new republic to Washington. Recalled three years later by President Lamar he was elected to the Texas Senate and soon became the presiding officer of that body. When Sam Houston was re-elected president, in 1841, he appointed Dr. Jones Secretary of State.

When the new secretary took over the State Department of Texas he found himself with complicated problems on his hands. On one side he was badgered by the many citizens of Texas, originally from the Southern States, who wanted Texas annexed to the Union as a slave-holding State. Earlier efforts to purchase Texas by the United States having been rejected with scorn by the Mexican government, and three treaties of annexation drawn up between the two republics having failed to obtain the two-thirds majority in the United States Senate necessary for ratification because of the anti-slavery sentiment in the Northern States, both President Houston and Secretary Jones had grave doubts as to the possibility of bringing about a union between the two republics no matter how much the citizens of Texas might desire it.

Pressure was also being brought to bear on Secretary Jones by the British government which was taking an active interest in Texan affairs. Always on friendly terms with Mexico, England had at first frowned on the Texan revolutionists. As soon, however, as it became convinced that Mexico could not reconquer Texas it became actively in favor of Texan independence. It recognized Texas as an independent republic,

used all its great influence to keep it so, and induced France to join in the same endeavor.

To the south Jones was threatened with invasion from Mexico which, though it had withdrawn its troops from Texas, refused flatly to acknowledge independence and still, though no hostilities were under way, maintained that a state of war existed. England's first step was to offer to Secretary Jones its assistance in correcting this situation and, by its influence, soon induced both Mexico and Texas to declare a truce. But what Jones and Texas really wanted was a final peace and independence, not merely a truce with a hostile Mexico on her borders ever ready to reinvade.

Lord Aberdeen, British Secretary for Foreign Affairs, sent to Texas as chargé d'affaires an experienced diplomat, Charles Elliott, who became very friendly with Secretary of State Jones and made it perfectly clear to him that England favored an independent State of Texas and would do everything in its power to prevent the annexation of Texas to the United States, to whose extension farther westward it was bitterly opposed. He also told Jones that his country was strongly opposed to slavery and was anxious to obtain from Texas special trade concessions so that English mills could procure their cotton from Texas at a price lower than they were forced to pay to the Southern planters. Comte de Saligny, who had been sent over by France, backed Elliott in all his proposals.

The proposition that Lord Aberdeen presented to Secretary of State Jones through Elliott, known as "the Diplomatic Act," was that an alliance should be formed between Texas, England, France, and the United States, if the latter would come into it, which unquestionably would not happen. These combined powers would use their influence on Mexico to procure her acknowledgement of the independence of Texas and would guarantee the integrity of her borders by armed force if necessary. In return Texas would agree to remain an independent republic, would refuse all offers of annexation "to any other power," and would extend to the contracting parties certain special trade priorities.

Acceptance of this offer would preclude Texas ever becoming part of the United States and would make her virtually a British protectorate. This plan was bitterly unpopular with most of the citizens of Texas and aroused indignant opposition in the United States. It was, however, given serious consideration by Secretary Jones, who seems always to have leaned more towards independence than annexation. He was more interested in

peace and security than the means by which they were to be obtained.

As Sam Houston's second term as president drew to a close and the Texas constitution forbade any man occupying the presidential chair for three consecutive terms, the retiring President threw all his great influence in favor of his Secretary of State to be his successor with the result that Dr. Anson Jones was elected and on December 9, 1844 entered upon his duties as President of the Republic of Texas.

During the last few weeks of his administration, after Anson Jones had been elected to succeed him, President Houston suddenly issued an executive order to his Secretary of State instructing him to accept Lord Aberdeen's offer of independence under the protection of England. Jones, however, well aware of the sentiment of the country favoring annexation to the United States, though he himself was inclined to favor the British proposal, temporized and delayed until Houston's term had expired. Thus by Jones' Fabian policy Texas was saved for annexation to the Union at a later date and a probable war between England and the United States averted.

The election of Polk to the presidency of the United States the same autumn on a platform of annexation of Texas to the Union made another offer of annexation a foregone conclusion. In preparation for this President Jones asked Captain Elliott to go to Mexico City on a special mission to endeavor to procure from President Herrera, who had recently been elected to succeed the deposed Santa Anna, an acknowledgment of the independence of Texas. Elliott, believing that his hard diplomatic labors were at last to be crowned with success and that the new President of Texas was going to accept Lord Aberdeen's proposal of a British protectorate, went off to Mexico fired with enthusiasm. With the great influence of His Majesty's government behind him his efforts were so effective that the Mexican government for the first time agreed to a treaty recognizing the independence of the Republic of Texas, on condition that Texas agreed to remain independent and promised not to allow itself to be annexed by any other country. This treaty was forwarded to President Jones for ratification by the Texan Senate. This he retained for now if the expected proposal of annexation failed in consummation, this treaty could be ratified and Texas would forever be safe from Mexican aggression.

When in the last days of Tyler's administration the Congress of the United States passed a resolution offering statehood to Texas, thus

avoiding the two-thirds vote of the Senate necessary for a treaty, President Jones called a convention and put before it the two propositions, one for the continued independence offered by Mexico and the European powers, the other for annexation to the United States. On July 4, 1845 the convention voted almost unanimously for annexation with the result that on February 19, 1846 President Anson Jones turned over his authority to James Pinckney Henderson, the first governor of Texas under the United States, and the lone star flag of the Republic of Texas was replaced by the Stars and Stripes.

In his valedictory on that occasion the retiring president said:

> The great measure of annexation, so earnestly discussed, is happily consummated. The present occasion, so full of interest to us and all the people of this country, is an earnest of that consummation; and I am happy to greet you, their chosen representatives, and to tender to you my cordial congratulations on an event the most extraordinary in the annals of the world—one which makes a bright triumph in the history of republican institutions. A government is changed both in its officers and in its organization, not by violence and disorder, but by the deliberate and free consent of its citizens; and amid perfect and universal peace and tranquillity the sovereignty of the nation is surrendered, and incorporated with that of another . . . . The Lone Star of Texas, which ten years since arose amid clouds, over fields of carnage, and obscurely seen for awhile, has culminated, and following an inscrutable destiny, has passed on and become fixed forever in that glorious constellation, which all freemen and lovers of freedom in the world must reverence and adore—the *American Union*. Blending its rays with its sister States, long may it continue to shine . . . . The first act in the great drama is now performed. The Republic of Texas is no more.

President Jones retired to his plantation on the Brazos River, named "Barrington," in honor of his birthplace, but kept in active touch with State politics, usually in opposition to the policies of Sam Houston and in sympathy with the other slave-holding states of the Union. In 1857 he ran for a seat in the United States Senate but was defeated, and early in 1858 shocked the whole state by taking his own life in Houston.

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On Spanish Neglect of Harvey's "De Motu Cordis" for Three Centuries, and How It was Finally Made Known to Spain and Spanish-speaking Countries†

J. J. IZQUIERDO*

IN 1936 I wrote and published a book *Harvey, iniciador del método experimental* (32) to call the attention of people in Spanish-speaking countries to William Harvey's book *Exercitatio anatomica de motu cordis et sanguinis in animalibus* (24). This, to me, is the earliest and at the same time, most brilliant report ever made by the human intellect on results obtained in the field of biological science by the use of scientific method based on experiment. Because of these merits, Harvey is entitled to the very first position among experimenters in biology. His book is still a very valuable source of information and one inspired by the truest spirit and philosophy of scientific research.

When, in 1928, we celebrated the tercentenary of Harvey's book, it had been published twenty-one times in Latin; once in Flemish; twice in German; twice in French and nine times in English (34). In addition, a new facsimile edition and another English edition were published in the same year (36). As the book had never been rendered into Spanish, I undertook the task of doing it myself, and had it included as one of the following five sections into which my work (32) was divided: (i) antecedents for better appraising the merits of Harvey's book; (ii) origin, value and scope of its conclusions; (iii) a facsimile reproduction of the original Latin edition; (iv) a study of the factors responsible for the neglect of Harvey's book for more than three centuries in Spain; and (v) the first Spanish version of the work with footnotes.

In this paper, part of the information contained in section iv will be presented in a summarized, but at the same time more complete form,

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† Read at the Royal Society of Medicine, London, England, November 6, 1946.

to show, first, that Harvey's book was not known in Spain during such a long period of time, and then, to consider the factors responsible for its not being known.

I. HARVEY'S BOOK UNKNOWN IN SPAIN FOR MORE THAN THREE CENTURIES

a. First period (1628-1727)

When the Duke of Lennox visited Spain in 1631, Harvey was in his party and remained there for about a year (12, p. 84). It is highly probable that he took copies of his book with him, and that he had them presented to the court doctors; also that he performed vivisections before them, because it is known that shortly afterwards, when he was in Germany, he made them as a public demonstration, in a vain effort to have Professor Gaspar Hoffmann converted to his views (12, p. 113).

Be that as it may, the fact is that doctors in the court of King Philip the IV of Spain, although considered not inferior to but indeed far more advanced than others in their time by Hernández Morejón (26, iii, p. 27), were not interested in Harvey's views. Like other medical men in their time, they submitted unconditionally to the classical opinions of the past, and were not prepared to accept any view which was not to be found in the classical authors.

Nevertheless, Harvey's views had at least five early supporters in Spain.

a) Don Gaspar Bravo de Sobremonte (1610-1683), of the then celebrated University of Valladolid, who wrote a book (4) in 1649 which, although frequently quoted, I have not been able personally to see and verify.

b) Don Francisco Morelló, Professor at the Medical Faculty of Barcelona, who, in 1678, published his book *Medicinale patrocinium in sanguinis circulationem* (Fig. 1) with the specific purpose of answering objections made against the circulation. This book is very rare, and the only copy I have been able to see is the one in the Army Medical Library in Washington.

c) Professor Luis Enríquez de Fonseca, in another book, *Novae securae curationes podagrae,* 1687 (15), had a section devoted to the circulation.

d) Doctor Juan Alós, of the Medical Faculty at Barcelona, in a book *De corde hominis disquisitio physiologico-anatomica* (1) (Fig. 2), pub-

lished in 1694, deplored the fact that the true facts on the circulation of blood, which most eminent medical men had so firmly and openly accepted, could still be controverted by people who, although they had

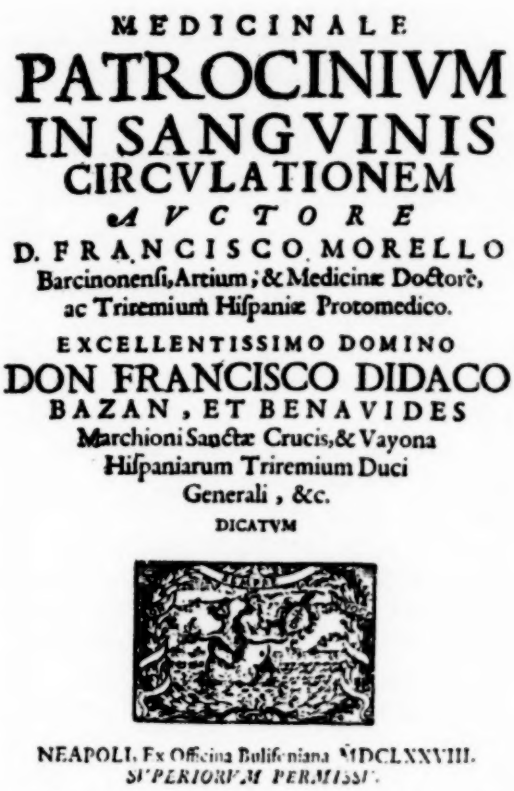
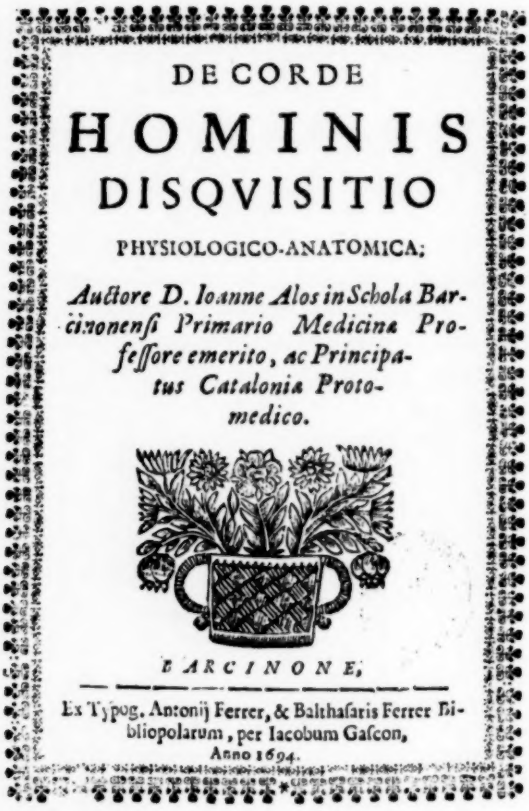

MEDICINALE
PATROCINIVM
IN SANGVINIS
CIRCVLATIONEM
AVCTORE
D. FRANCISCO MORELLO
Barcinonenſi, Artium, & Medicinæ Doctore,
ac Triremium Hiſpaniæ Protomedico.
EXCELLENTISSIMO DOMINO
DON FRANCISCO DIDACO
BAZAN, ET BENAVIDES
Marchioni Sanctæ Crucis, & Vayona
Hiſpaniarum Triremium Duci
Generali, &c.
DICATVM
NEAPOLI, Ex Officina Bulifoniana MDCLXXVIII.
SUPERIORUM PERMISSU.

Fig. 1. Title-page of Morelló's *Medicinale patrocinium in sanguinis circulationem* (1678). Copy in the Surgeon General's Library, Washington, D. C.

never made a proper examination of the circulation, rejected and scorned Harvey's discovery (1, p. 166). Alós informed the reader that if many doctors did not accept circulation, it was on account of difficulties which they were unable to resolve; and furthermore, they condemned it for being contrary to the right use of the true art, and as undermining the dogmatic medicine of their days because it contradicted the hypotheses grounded in antiquity (1, p. 189). But Alós declared that if Galen himself had come to life, "he would find himself moved to change a good proportion of his own views, which although still partly sound, in a larger proportion had become false and even ridiculous" (1, prologue).

With the exception of these four men, the medical profession in Spain was against Harvey's views for the very same reasons that the medical men of other countries were opposed to them.


DE CORDE

HOMINIS

DISQVISITIO

PHYSIOLOGICO-ANATOMICA;

Auctore D. Ioanne Alos in Schola Barcinonenſi Primario Medicinæ Profeſſore emerito, ac Principatus Cataloniæ Protomedico.

BARCINONE,

Ex Typog. Antonij Ferrer, & Balthaſaris Ferrer Bibliopolarum, per Iacobum Gaſcon, Anno 1694.

Fig. 2. Title-page of Alós *De corde hominis disquisitio physiologico-anatomica* (1694).

Gaspar Caldera de Heredia (1591- ?) in 1658 wrote *Tribunal* (5) a survey of current medical opinions. Although it is a large folio volume, Harvey's name is not even mentioned. He received little more consideration from Juan de la Torre, in 1666, who declared in his book *De sanguinis officina, motu ac usu libri tres* (13) that "his conscience did not allow him any longer to tolerate the scandal Harvey had originated."

Francisco Enríquez de Villacorta, who wrote in 1670 his *Laurae doctoralis medicae complutensis* (16) as a summary of the knowledge

needed at the University of Alcalá de Henares for obtaining the medical doctorate, made no reference to circulation.

Pedro Miguel de Heredia (1590-1659), in the two volumes of his *Operum medicinalium* (25) published in 1688, confined himself to traditional learning.

Don Matías García (-1691), Professor of Anatomy at the University of Valencia, far from upholding Harvey's views on the circulation, was so hostile to them, that in 1677 he had a book published, *Disputationes medicinae selectae* (19), specifically to contradict a discovery which he considered "a danger that might spread as the contagium of a venom," and thus "greatly pervert the true medical precepts." According to Piquer (52, Fig. 3) García accepted Harvey's views, when young, on account of

sium Catalanum in suo opere *de Motu cordis*. Inter eos, qui sanguinis circulationem negantes, eam acriter & nervosè impugnarunt, numerandus Mathias Garcia, in Universitate Valentina publicus Anatomiae professor, & inter sui temporis Medicos celeberrimus. Hic auctor ingenio, doctrina, & multiplici experientia anatomica clarus, *considerans saepius & experimenta tanta (scilicet ab Harveo proposita) & tam benè stabilita legens, anceps stupefactus permansit multo tempore.... Atque ut in re tam ardua suam propalaret sententiam, quamplurimas anatomicas administrationes in anguillis, ranis, columbis, & aliis animalibus administravit, colcctoque spiritu (non quia nova & contra antiquitatem directè pugnans) Harvei sententia dissona apparuit experientiae, & rationi, sensui, & menti.... Et cum Harveus, experientia praecipuè anatomica, fidem faciat, idem & facero* (promittit) *ne amplius Harveus, vel sequaces illius conquerantur, talem opinionem non quaestiunculis & rationibus metaphysicis, sed ex viva sectione sumptis, esse rejiciendam* (a). Licet hujus magni professoris argumenta ad-

(a) Matth. Garc. *Disp. de Motu cord. in Prooem. pag. 2.*

Fig. 3. Facsimile of a part of page 199 of Piquer's *Institutiones medicae* (1773 edition).

the many experiments he offered to prove it, but when subsequently the book of Bravo de Sobremonte (4) came into his hands he began to have doubts. He "performed numerous vivisections on eels, frogs, doves and other animals, with the purpose of judging for himself in such an arduous

matter." But as he was no more than a mere disputator in the manner of the times, blinded by tradition and with scarcely any ability to perform experiments and judge upon their results, he found himself driven into still greater confusion, and declared that Harvey's opinion was "in discord with the reason, with the senses, and with the mind" (García, Proemium, p. 2, quoted in 52).

When the seventeenth century was nearing its end, in 1699, Don Alonso López Cornejo, Professor at the Medical Faculty at Seville, published his book *Galeno ilustrado, Avicena explicado y doctores sevillanos defendidos* (40). This was written to refute the new medicine and in it he maintained that the Spanish doctors, "being so lofty in their discerning powers" (*ibid.* 214-15), considered that "Harvey and the other recent circulators had only clarified and made more perfect a point upon which they had been illuminated only by Hippocrates and Galen" (p. 13).

A hundred years after the publication of the *Exercitatio,* not even the Barcelona Medical School, where Morelló and Alós had defended Harvey's revolutionary work, was able to support his teaching, because it had been suppressed in 1714 by Philip V of Spain.

b. Second period (1728-1827)

At the time when Harvey's *Exercitatio* entered into its second century Don Marcos José Salgado (1671-1740) Professor at the Medical Faculty at the University of Mexico, published a treatise on physiology (55) which was the first one written and printed in the New World (29, pp. 57-110, and 30). On the first page of his book he promised to deal with his subject "in conformity with the discoveries of the moderns" (Fig. 4). Nevertheless, from an examination of its contents (29, pages 76-77) it seems highly probable that he never saw Harvey's work, and made only second-hand references to it. There are very good reasons for suspecting that Harvey's book never reached New Spain.

At that time, there was a teacher of anatomy in the faculty of Seville named Don Martin Martínez (1684-1734). He was a man who, during his lifetime, was declared "worthy of immortality" (18, II. 355) and after his death was referred to as "insigne anatómico" (47, III. 70), a title which he evidently does not deserve (41, p. 36, 102 & 126; 20, p. 475). In his book *Medicina scéptica* (1748) Martínez showed great

admiration for Bacon's experimental philosophy, protested against traditional verbalism, and urged reformation in medical teaching and thought

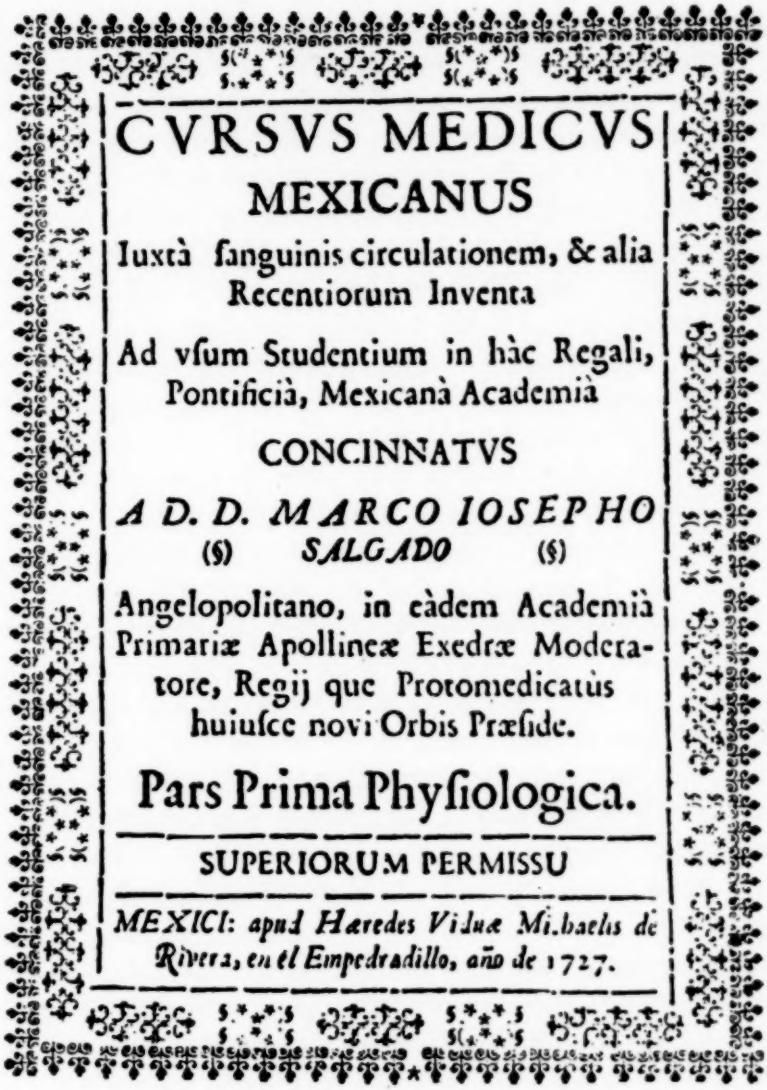

CVRSVS MEDICVS
MEXICANUS
Iuxtà ſanguinis circulationem, & alia Recentiorum Inventa
Ad vſum Studentium in hàc Regali, Pontificià, Mexicanà Academià
CONCINNATVS
A D. D. MARCO IOSEPHO
(§) *SALGADO* (§)
Angelopolitano, in eàdem Academià Primariæ Apollineæ Exedræ Moderatore, Regij que Protomedicatùs huiuſce novi Orbis Præſide.
Pars Prima Phyſiologica.
SUPERIORUM PERMISSU
MEXICI: apud Hæredes Viduæ Michaelis de Rivera, en el Empedradillo, año de 1727.

Fig. 4. Title-page of Salgado's *Cursus medicus Mexicanus, pars prima physiologica* (1727), the first book on physiology written and printed on the American continent.

(41, pp. 124-25). Nevertheless in his *Tratado de anatomía* (46) he proved himself very much behind his time, both in physiological and anatomical knowledge; he was still dubious about the auricles being really muscular;

assigned to them, as well as to arteries, pure Galenic functions (46, p. 252); and presented pulmonary circulation as ending in the cava vein (p. 302).

Towards the middle of the eighteenth century, Don Andrés Piquer (1711-1772), professor at the medical faculty in Valencia, was as notable a professor as anticirculationist, and invoked the same arguments used by García one hundred years earlier. In his *Institutiones medicae: medicina vetus et nova* (52) Piquer charged Harvey with having taken his discovery from others, out of a mere love of novelty (p. 175); for this reason, the great doctors had revolted against him (p. 198). Furthermore, he declared that "everything pertaining to circulation had originated rather in hypothesis than in the faithful observation of nature" (p. 344)!

If these were the opinions of the professors at the medical faculties, those of the great practitioners of the time necessarily could not be very different. Don Francisco Solano de Luque (1685-1738) deserves a prominent place among them, because of his fame for making prognoses from the pulse (17, V. 205, 209). Apart from his *Observaciones sobre el pulso* (58) printed only many years after his death, in another book, *Lydos Appollinis* (57), he showed himself so proud of his abilities that in the most emphatic way he went on to declare that the classical writers of antiquity had nothing to do with them (57, leaf 2 recto and verso). Furthermore, he addressed himself to Hippocrates in an imprecative mood, to tell him that "that secret power of his was probably the same he had communicated to Democritus, under the promise of not having it revealed to any one else" (*ibid*). But Solano's prognoses were the product of his fantasy, and not of his knowledge of the circulation, which was nil (see 32, p. 216). As a matter of fact, the editor of his *Observaciones* presented him both as a "credulous man and a practitioner with no discernment." But for one of the historians of medicine in Spain, he was "immortal, because heaven had granted him the most delicate tact and the most sublime judgement, for an unknown and glorious revolution in semiotics" (26, VI. 279), and according to Father Feijóo, Solano's discovery was enough to put Spain above all other nations in the art of medicine.

I must not omit a very curious piece of information which Don José Antonio Rodríguez (1709-1781), a Cistercian monk who was famous as writer and physician, gave concerning Harvey's work. On page 141 of his *Dissertaciones physico-médicas sobre el problema de la respiración*

(54) he wrote what may be translated as follows: "William Harvey and Richard Lower made the experiment of having all the blood, or nearly all the blood, substituted by beer and wine . . . and in these experiments the animals lived and their liquids circulated by the organic impulses."

And now, we have for our consideration a learned man who was mainly responsible for starting the strong nationalistic movement which claimed that long before Harvey, the Spaniards were already well informed on the circulation: Fray Benito Jerónimo Feijóo (1676-1764), a Benedictine monk, who always read the best authors, and who was engaged from 1726 to 1740 in publishing his *Teatro critico* (18), and from 1741 to 1760, his *Cartas eruditas* (17). A great admirer of antiquity, but still more of Francis Bacon, he was convinced that experimental science should be preferred to ratiocination (18, I, 149), and that new roads for progress ought to be followed by the medical sciences (18, VII. p. 346).

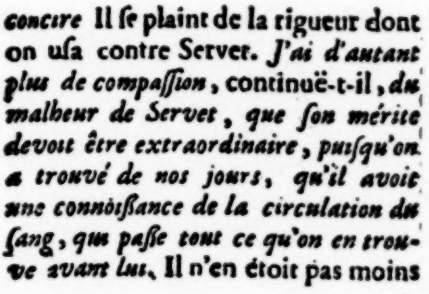

concire Il ſe plaint de la rigueur dont on uſa contre Servet. *J'ai d'autant plus de compaſſion*, continuë-t-il, *du malheur de Servet, que ſon mérite devoit être extraordinaire, puiſqu'on a trouvé de nos jours, qu'il avoit une connoiſſance de la circulation du ſang, que paſſe tout ce qu'on en trouve avant lui.* Il n'en étoit pas moins

Fig. 5. Facsimile of the passage in *Mémoires de Trevoux* (1737) unwarrantably used by Feijóo to prove his assertion that Servetus was the true discoverer of the circulation of the blood.

To begin with, Feijóo was enthusiastic about the "noble discovery" of the "famous William Harvey" (18, I. prologue). Later, he declared that Cesalpinus was the "true inventor," and that Harvey had only extracted the truth from his writings and found the proofs for it; that by doing this Harvey had stained his glory by his desire for fame and detracted from those who more rightly deserved it (18, IV. 315). Subsequently he announced that from a quotation from the letters of Leibnitz, made in Trevoux's *Mémoires pour l'histoire des sciences et des beaux arts* (60) it should be acknowledged that the real discoverer of the circulation of the blood, had been "that famous antitrinitarian heretic Miguel Serveto"

(18, IV. p. 315). As a matter of fact, in the passage he quoted, no estimation was made of the degree of knowledge Servetus had upon circulation, nor was the title of "true discoverer" given to him. It was merely asserted that Servetus' knowledge exceeded in degree that found in authors before him (Fig. 5). But in connection with this, after careful revision made elsewhere (31) of the views which Servetus really expressed and of those which were unduly granted to him, I have concluded that what Servetus wrote was more a product of fancy and imagination than the result of using methods of inquiry based on experiments (31, p. 931). Therefore, it is very surprising to find in Codorniú (9, p. 179) the assumption that "the very reasons used by Servetus had been the same used by Harvey to gain immortality"; in Hernández Morejón (26, II. 51) the declaration that Servetus' explanations were so final and definitely clear as to make it impossible to add anything further; and in Mariscal (42, p. 78) that in Servetus' book were contained *all* the discoveries to be made later on.

Father Feijóo's opinion entered, finally, into a third phase, during which he seemed to be anxious to discover old forgotten glories and to demonstrate that the Spaniards had been the first to know about the circulation. His attention was caught by a passage written in 1564 by Francisco de la Reina, a veterinary surgeon of Burgos, whom more critical students have later declared to be "without any adequate knowledge in anatomy" (11, pp. 50-51). His *"Libro de albeytería"* (14) contains the vague statement that *"la sangre anda en torno y en rueda por todos los miembros"* (the blood goes around in wheel-like fashion through the limbs) and this seemed so satisfactory to Father Feijóo that he gave Reina the title of discoverer of the circulation, took it away from Cesalpinus, and once more blamed Harvey for having taken to himself the fame of the discovery (17, 1750, III. 314 and 318, and 18, IV. p. 315).

So Feijóo laid the foundations for the strong nationalistic movement, which was to be begun again in the middle of the eighteenth century, to maintain that not one, but many Spanish doctors had preceded Harvey in the fundamental discoveries in connection with the circulation of the blood.

By 1804, Father Andrés (1740-1817) although recognizing himself "a foreigner in the matter," was already declaring (2, pp. 407-09) that if by the middle of the sixteenth century, a theologian and a veterinarian

already had an idea of the circulation, then, far from being new for the Spaniards, this idea was rather a commonplace in their schools at that time.

c. Third period (1828-1927)

During this period, Harvey's classical book was ignored in Spain even by men who sympathized with the idea that medicine has to be grounded upon observation and experiment. Thus, in an "historico-critical survey of the more recent, so-called cartesio-baconian period of medicine," written by Don Manuel de Hoyos Limón in 1854, Harvey's experimental contributions and his name were omitted (28, p. 63).

Contrariwise, the snowball which Father Feijóo had pushed down the hill was growing to large proportions as a result of the efforts made by the historians of medicine in Spain, who put themselves to the task of showing that the circulation of the blood had been known to Spaniards long before Harvey. In the very first rank, because of the enthusiasm of their efforts, we must place Hernández Morejón (26) whose extensive *Historia bibliográfica de la medicina Española,* in 6 volumes, was published from 1843 to 1850, and Chinchilla (8) whose book, published in 1861, reflects in its title the great passion which guided its preparation, *Triunfo de la medicina Española, o sea descubrimiento de la circulación de la sangre en el hombre, por los médicos Españoles.* Others come afterwards (7, 9, 23, 61, 63).

In different passages found in the fourth century writings of Nemesius, Bishop of Nemesa; in others from the learned Archbishop of Seville, Isidore, who lived in the sixth and seventh centuries; in others from the works of Constantinus Africanus (1015-1087), and in a book of psalms, published by Bishop Pérez de Valencia in 1484, Hernández Morejón imagined that he found the circulation described with such great accuracy, that he once again repeated the view that if laymen had been able to express themselves in such definite terms, the doctors must have been well informed on the matter (26, II. p. 37, etc.). To these quaint old claims, of course all quite untenable, Hernández Morejón and Chinchilla added eleven authors, who, according to them, had given evidence in their writings of a knowledge of the circulation during the sixteenth century and the first quarter of the seventeenth, long before the publication of Harvey's book. Let us refer to them briefly.

Andrés Laguna (1494-1560) supposed by Chinchilla (pp. 45-52) to have given a "perfect description" of pulmonary circulation in 1535 (35), in the passages taken from him, merely gives an account of the Galenic views current in his time.

Luis Lobera de Avila wrote in 1542 in his *Libro de anatomía* (39) (quoted by 26, II. 43-44; 8, 60): "Through the right opening of the heart enters the vena cava, that carries blood to the heart, and from the same goes out the vena arterialis, which goes to the lungs. From the left opening go out both the arteria venalis, which attracts from the lungs, and the arteria magna which conveys to parts in the body" (*"in illi sunt duo orificia; per dextrum ingreditur vena cava sanguinem cordi aportans: ab eadem egreditur vena arterialis quae vadis ad pulmones. Ex sinistro egreditur arteria venalis, quae trahit ex pulmones, et arteria magna quae defert ad partes corporis"*). Hernández Morejón and Chinchilla misinterpreted the entering of the vena cava to the heart as meaning the entering of blood returning in the general circuit. But it is quite clear that Lobera was only describing the well-known Galenic functions attributed to the right heart for distributing the blood from the liver to the parts, the lungs included; and to the left heart, for sucking air from the trachea and sending it through the arteries, to the different parts of the body. Comenge, a more critical historian of Spanish medicine, recognized this some time ago (11, p. 27).

Pedro Gimeno, first credited with having described the pulmonary circulation (8, p. 58) in his book *De re medica* (22), and more recently declared to have asserted definitely that blood "combined" with the air in the lungs (42, pp. 30-32), in reality expressed only the Galenic view of the blood being freed of its sooty impurities in the lungs, and was quite far from the time when it would be possible to make descriptions in terms of chemical combination.

On the evidence of long paragraphs from his book *Anatomia del cuerpo humano* (49), Bernardino Montaña De Monserrate, was added to the list of people supposed to have early knowledge of the circulation in Spain (26, II. 45; 8, pp. 79-81). Nevertheless he was a pure Galenist; it has been shown that the passages quoted in his favor were purposely either altered or mutilated (11, p. 49).

Juan Valverde de Hamusco was a very distinguished anatomist of the sixteenth century. After working for a period of time in Padua with Vesalius, he published in 1556 his famous *Historia de la composición del*

cuerpo humano (64) not one year before, as Mariscal asserted (42, 78), but thirteen years after *De humani corporis fabrica* (65), Vesalius' epoch-

ONSIDERANDO Illuſtriſs.Señor la gran falta,que la nacion nueſtra tiene de hombres,que entiendã la Anatomia: aſſi por ſer coſa fea entre Eſpañoles, deſpedaçar los cuerpos muertos,como por auer pocos, que venidos â Italia, donde la pódrian deprender, no huelguen antes de occuparſe en otros exercicios q̃ en eſte,por no eſtar acoſtumbrados, a ſemejantes coſas: y viſto el daño,que deſto ſe ſigue a toda la nacion Eſpañola, parte por los Cirujanos (a quien mas falta haze nò entenderla)ſaber poco latin,parte por auer

to tiempo ſepultada,ni el Veſalio vuiera meneſter tomar tanto trabajo. Al qual yo ſeguire ſiẽpre en toda eſta hyſtoria,ſaluo enla ordẽ del eſcriuir,enla qual es algo cõfuſo (por no querer apartarſe de Galeno)y en algunas coſas,en que cierto vſo menos diligẽcia dela que ſe requeria(por vẽtura çanſado del largo trabajo) las quales yo notare en ſus lugares,mas cõ intencion q̃ â eſta hyſtoria no falte nada, q̃ cõ gana de reprehender a quien tanto todos deuemos. Antes todo el prouecho que deſte mi libro reſultare, ſe a' de atribuyr no menos a Andres Veſalio,que â Realdo Colõbo mi precetor en eſta coſa,el qual no pienſo que ſera pequeño: principalmente ſiendo acõ

Fig. 6. Facsimiles of passages in Valverde's *De la composición del cuerpo humano.* (1556). Above, fragment from page 11. Below, fragment from the verso of the same.

making work which appeared in 1543. Inspired by his great master, Valverde continued his researches, supposing himself more diligent than Vesalius in clarifying some matters. His purpose was to call the attention of the surgeons of his country to the importance of getting first-hand knowledge of anatomy through dissection of corpses, a proceeding which they generally abhorred (Fig. 6, a). The most superficial inspection is enough to show that his plates, although perhaps most beautifully engraved in copper by the Spanish artist Gaspar Becerra, were based on those of Vesalius. Now it cannot be denied that Valverde described the

pulmonary circulation, as has been pointed out by Andrés (2, p. 410), Comenge (11, p. 59), and Mariscal (42, p. 46). But since he gave all the credit for this to Colombo (Fig. 6, b), the matter is definitely settled at once.

Juan Calvo, professor at the medical faculty in Valencia, who is said to have been one of the surgeons in the ill-fated Spanish Armada, published in 1580: *Cirugía universal y particular del cuerpo humano* (6). The purely Galenic passages which have been alleged to contain a description of the pulmonary circulation (8, p. 96; 11, p. 48; 21, p. 410 and 42, p. 48) are, in fact, insubstantial as a proof for such a claim (see 32, pp. 245-246).

Mercado. Anatomía del Hombre. pág. 505.

Habet (*vt ſuperius dictum eſt*) is venter in parte ſui ſuperiore duo inſignia foramina, quæ profecto non mediocrem in pulſus harmonia præſtant vſum. Primum itaque, cuius ſitus eſt prope auriculam illius lateris, præbet exitum arteriæ cuidã, quam optima ratione *arteriam venalem* Galen. & Medici omnes appellant. Cuius arteriæ miniſterium eſt, aerem in cor ipſum à pulmonibus tranſmiſſum deuehere: in qua ſane re non diſplicet Neoterici cuiuſdam opinio, qui tenet, tenuiſſimum etiam ſanguinem per hanc arteriam in cor diffluere, quem ſanguinem ſuſpicor eſſe ex vena arteriali per reſudationem in pulmonis ſubſtantiam tranſmiſſum, ibidemq, elaboratum, ea tenuitate & ſubtilitate, quę ſufficiat conuerſioni in ſpirituum ſubſtantiam in corde ipſo, poſtq̃ ſimul cũ aere in ſiniſtro ventriculo receptus eſt. Ex quo quidem ſanguine, & ex eo, q ex dextro cordis vẽtre commigrat in ſiniſtrum (*licet craſſior ſit*) facile arterioſus & ſpirituoſus ſanguis fieri poteſt. .

Fig. 7. Facsimile from page 505 in Mercado's *Operum, tomus II* (1619).

Bartolomé Hidalgo de Agüero (1531-1597) was the author of a *Tratado de la anatomía del cuerpo humano* (27) which is included in a larger work, *Tesoro de la verdadera cirugía* (1584). Again, from passages in this book, as well as from a posthumous edition of the writings of this surgeon, gathered and published in 1604 by his pupil Guillén (42, p. 56) the conclusion was reached that he had made a "very perfect" (*perfectisima*) description of the circulation (8, pp. 98-100). Nevertheless, his views were merely Galenistic (see 32, p. 246).

Similar remarks apply to Andrés de León's book *Libro primero de annathomía,* 1590 (38). Chinchilla (8, p. 103) declared that its contents left no room for doubting that he was describing the mechanism of the general circulation, but Comenge recognized not only that he was unoriginal, but also that he exhibited confusion (11, p.103).

Of Juan Sánchez Valdés de la Plata it was asserted that he had been well informed on the circulation (26, II. p. 44) in his book *Historia general del hombre,* 1598 (56). More recently, an amendment was made by his supporters, which reduced his knowledge to the category of "vague, uncertain and deficient" (42, p.53). And this is true, because apart from being a Galenist, he described the pulse (56, p. 97) as occurring in the veins.

Of Luis Mercado (1525-1611), professor at the medical faculty in Valladolid, Physician of both Philip II and Philip III of Spain, and author of "*Anatomía del hombre*" 1584 (48), it may be said that in his book he certainly made a clear reference to pulmonary circulation, as I have been able to see in a later edition—the only one I have been able to consult (Fig. 7). But in the same source, it will be noticed that Mercado presented these particulars not as his own, but as taken from a contemporary writer (*Neoterici cuiusdam opinio*).

Of Francisco Matías Martí, professor at Valencia, and author of a book *De facultatibus naturalibus* 1616 (43), Chinchilla (8, pp. 105-106) said that he showed a knowledge of the circulation, which is indeed found to be the case, since he apparently expresses very clearly that the blood returns to the same point whence it started, to continue its giratory movement. I say "apparently," in the first place, because I have not come across this book, and in the second, because I know there is some doubt about the authenticity of the paragraphs quoted (11, 51). Nevertheless, even if it is taken for granted that Martí had a more or less clear view of the circulation, it is sufficient, when we consider that Harvey was already exposing his views in public lectures, to make it probable that Martí was informed about them, although not in a very complete way, since he omitted all information on the valves of the veins and their function, which played such an important part in Harvey's demonstration. The question was put forward, on what could Harvey be teaching in 1628, twelve years after the publication of Martí's book (42, p. 60)? But the answer is an easy matter: his lesson consisted in presenting not mere conceptions which might be the product of a fertile

imagination, but in presenting them as interpretations of facts secured through observation and experiment and interpreted through the working of the mind. Martí did not base his views on any experiment, as Harvey did.

d. Fourth period (1928 on)

Only three years after Harvey's *Exercitatio* entered into its fourth century, a new book *"Participación que tuvieron los médicos españoles en el descubrimiento de la circulación de la sangre"* (42) was published in 1931, by Doctor Nicolás Mariscal. This work tried to revive with great enthusiasm the nationalistic movement and tended to show the priority of the Spanish doctors in the knowledge of the circulation before Harvey, and to blame foreigners for having appropriated to themselves a discovery made entirely by Spaniards. Up to that point, the movement had been carried on under such slogans as "great discoveries, as many other great things, have been started by Spaniards" (42, p. 9) or "everything for Spain" (42, p. 58). The assertions made required a most scrupulous comparison of the writings of the Spaniards with those of Harvey. But attention was mainly concentrated on the papers by the national writers, and Harvey's work was considered only in rather a superficial manner. Evidence has been presented in this lecture which shows that Harvey's *De motu cordis* remained ignored in Spain for more than three centuries. The closest approach was reached through authors who did not appear to have much direct knowledge of Harvey themselves (see 32, p. 222). Furthermore, in their quotations from the Spanish doctors, not sufficient care was taken to be accurate, and the Latin was interpreted to mean not what was in them, but what was in the minds of people who wished to find a certain interpretation in them. On the whole, it was a dispute of words, in which everybody was satisfied only with words, and never felt the need for finding out if behind the words there might be some scientific method of inquiry at work, or for directing the inquiry upon phenomena occurring in living things. Once the idea that the Spaniards had been the very first to know about the circulation, and that foreigners had appropriated to themselves what was not their own, had been allowed to develop, Spanish scholars were prevented from analyzing Harvey's work by the feeling of injustice or resentment which had been aroused in their minds. Few indeed were those who, like Comenge (11), Pérez

y López (51), and partially Turró (62) took a more critical stand in the dispute.

Thus, when I published in 1936 my book on Harvey (32, Fig. 8) I feared that my adverse opinion of the Spanish claims might call down

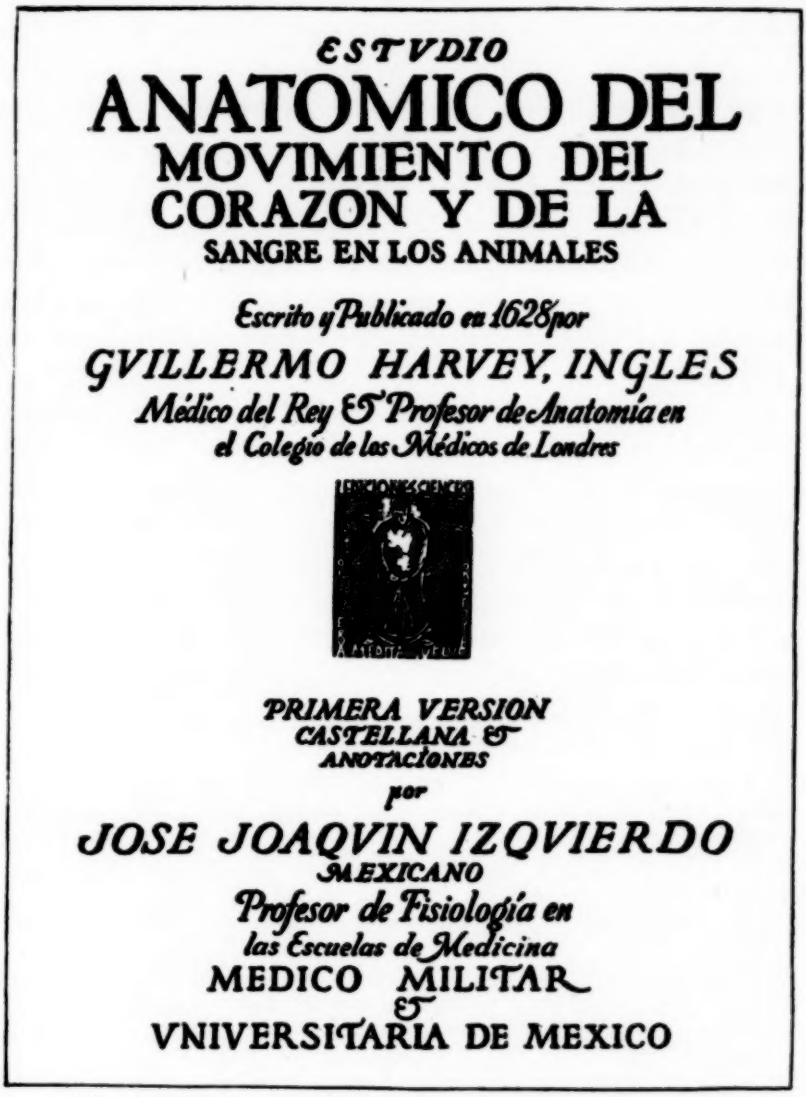


Fig. 8. Title-page of the first Spanish version of Harvey's *Exercitatio de motu cordis,* by Izquierdo. (1936).

upon me the passion and resentment of the nationalists. Therefore, the first copy which I sent to Spain, to the physiological department in Barce-

lona, was presented with the well known words to Nicomachus: "Amicus Plato; sed magis amicus veritas." But this time, Professor Jose María Bellido—although surprised to learn that in the past the Spaniards had lived in the conviction that Harvey's demonstrations did not constitute a true discovery, since even scientists of high distinction such as Ramón Turró (62) had not recognized him as the true discoverer of circulation—admitted that the assertions made in favor of his countrymen were groundless, and without the necessary direct knowledge of Harvey's work, and he welcomed my efforts to have the *Exercitatio* rendered into Spanish (3, pp. 420-422). Professor Augusto Pi-Suñer also accepted my criticism as fair, and considered that it put an end to polemics, and dispersed many illusions, and recognized that, although my criticisms were severe, my very severity was a guarantee of affection (53, pp. 170-72). The existence and value of Harvey's *Exercitatio* had been at last recognized in Spain.

A new edition of my Spanish version has been printed in Argentina (33), although, as Wolff has deplored (66), without the introductory part I prepared to call the reader's attention to Harvey's originality, both in his conclusions and in the use of new methods of research.

Since 1936, Harvey's *Exercitatio de motu cordis* is within the reach of all students in the Spanish-speaking countries, as a fountain to which they will turn, to find for themselves the methods and the inspiration for successfully "studying the secrets of nature by the way of experiment."

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A Short Abstract of a Long Life

ROBERT MEYER*

1897-1907

IN 1897 I took a practical course in embryology with Oscar Hertwig, who was famous for his observation of the fertilization of the sea-urchin ovum—the first microscopical description of fertilization (1875). Hertwig, who had written a wonderfully clear book on general biology, was a very clear-minded man who taught the students the elements of general biology in a practical manner by letting them study microscopical slides. I learned very much from him and especially from his book.

J. Veit accepted a call to the University of Leyden (Holland) as a teacher of obstetrics and gynecology. Before leaving Berlin, he told me, should I require material or counsel, to consult his friend Carl Ruge, the prosector of the University Gynecological Clinic.

It happened that a unique case slipped into my material, one that Veit had operated on, in which some almond-sized nodules of endometrium were encapsulated in a myoma of the uterus. While I worked on the origin of the adenomyoma, von Recklinghausen published his work on the mesonephric origin of "adenomyomata" of the uterus (1896), which were in reality adenomyosis. It was clear that one needed many uteri of fetuses and adults to test this theory and others. I went to Carl Ruge to show him my findings, the result of two years' work, and to ask for more material. He was enchanted and asked me to lecture on this topic at the Gynecological Society. I had not thought of such a possibility but intended to continue my work for at least a few more years. Characteristic of my state of mind at that time is the fact that I kept an extremely rare specimen, an osteoid tissue in the uterus of a fetus, hidden away in my desk and looked at it from time to time thinking that nobody else in the world could have seen this variety. I acted like a miser, which I never was.

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I accepted Ruge's offer and four weeks later I stood before that society with a brand-new projector made by Carl Zeiss, Jena. It made a deep impression. Before that time we could not project microscopical slides but only microphotos by blowing oxygen and hydrogen against a disk of calcium. That process, invented by Drummond, made a deafening noise. I had carefully worked out the text of the lecture, but since that malicious apparatus showed one slide after the other and it was dark in the room, I could not use the manuscript. At first my throat was choked but soon I spoke quite well. The topic was "The Genesis of the Cystadenomata and Adenomyomata of the Uterus," and I showed various kinds of adenomyoma, adenomyosis of the uterus and islands of endometrium in the uterine wall of a fetus of nine months, the continuous course of the Wolffian duct in a new-born from the ampulla through the cervix into the vagina down to the hymen, and other sections. At first a proponent of the theory of von Recklinghausen who had been my teacher, I later (1903) refuted it and showed a real adenomyoma of mesonephric origin imitating the epoöphoron or epididymis of the adults. Now that theory is almost forgotten but in retrospect one wonders how von Recklinghausen could in thirty cases have overlooked the connection of the adenomyosis with the endometrium, which is now quite clear. Was it perhaps the influence of the times which found it interesting to look for the unusual in "embryonal" histogenesis? First, it is impossible to learn embryology from books. Secondly, one can understand von Recklinghausen's misconception when one considers his deficient technique. I visited him in Strassbourg in 1898 and he was kind enough to demonstrate his sections to me, which he still cut by hand. So it was a matter of chance that he did not find the connection of adenomyosis with the endometrium. Only in later cases did he see it and have to admit in a supplement the possibility of the endometrial histogenesis. That was tragic. But it is of more importance that von Recklinghausen's monograph gave a mighty impetus to the work on adenomyosis done since that time. Previously not much was known about it and now every practitioner has to know it. It was W. A. Freund who first diagnosed the classic clinical symptoms of the "adenomyoma."

Let us not forget the impulse that gave us Sampson's theory of endometriosis. Who is right is of no importance; what is right is what matters. This axiom I applied then, forty years ago. It is more important that the work of a man stimulates others to go on working than that

his own conceptions become established. It is true that I have now changed my mind with respect to the question of adenomyosis. Some critics maintain that this is not right and stress the fact that the new points of view were reached indirectly, in the theory of adenomyosis as well as other problems. I have always thought that as long as a man can change his clothes standing up and can change his mind he is not yet really old.

Another question that has now quietly disappeared from discussion was then more important than the histogenesis of the endometriosis (*Virchows Archiv* 172 [1903]). It was one of the principles of general pathology that a carcinoma had to invade the surrounding tissue. From that concept it was reasoned that adenomyosis must be an inborn anomaly. Before speaking of inborn anomalies, one should be familiar with the fetal uterus and tubes, which are much too small for such a lot of anomalies. I have stressed the fact that the infiltrative proliferation alone does not necessarily mean malignancy (1903). Later, in the German Pathological Society (1906) I repeated that argument and I also argued for the theory that malignancy occurs often as a sequel to inflammation (Virchow). In an early work of mine (*Zeitschr. f. Geb. u. Gyn.* 1898) one point is of especial scientific importance; that is the proof that during development the foldings and the glands of the uterine mucosa always originate at the highest points, namely at the convexities of the mucosa in transversal cuts. The convexities produce a special tension. (This theory I generalized later on and applied after forty-eight years, in a work on the development of the ureter.) At about the same time (1898) I discussed some cases of double uterus. In one case the horns of the uterus were fixed at the canales inguinales and in the other case of uterus subseptus the lumina of the uterus were convergent on the dorsal side. It is difficult to decide what is a primary and what a secondary condition. In 1897 and 1898 I demonstrated some malformations and accessory adrenal tissue in the broad ligament of both fetus and adult. (The continuation of these studies is found in *Zeitschr. f. Geb. u. Gyn.* 41.)

I wrote a monograph entitled *Findings in the Fetal Uterus and in the Uterus of Children, including the Wolffian Duct* (Berlin 1899). In this book I brought out especially the facts that I had demonstrated in 1897 with many good lithographs. The book is quoted and has been called a classic. I made the same extensive studies on the same topic with respect to the uteri of adults for which the findings of the Wolffian ducts are

especially remarkable (*Zeitschr. f. Geb. u. Gyn.* 43 [1900]) and published excellent pictures of the Wolffian ducts in the cervix uteri. The following chapters are less important since I was still under the influence of von Recklinghausen's theory.

In 1901 (*Zeitschr. f. Geb. u. Gyn.*) I published a study concerning glands in the fetal vulva and vaginia. Many mucous glands occur in the vestibulum besides the duplication of Bartholin glands, especially some retrohymenal glands, and some in the posterior wall of the vagina as well as in the anterior part of the vestibulum adjoining the urethra. Entirely different are glands which arise on both sides from the sulcus coronarius of the glands of the clitoris and extend for some distance dorsally as tubules and end as dilated glandular parts in both corpora cavernosa of the clitoris. They persist not infrequently in adults. Generally the glands of the vestibulum are noted to be in regression later on but sometimes they persist, forming mucous cysts. Similar glands are found in adult domesticated animals.

In 1902 I used for the first time the new epidiascope of Zeiss to demonstrate a new kind of giant adenofibromyoma proceeding from a horn of the uterus, which consists of many thick-walled channels with one row of epithelium and two to three layers of fibrous tissue with a few muscle cells. These form intra-canalicular and intracystic fibromatous nodules. The coats of the channels and cysts are separated from one another by loose fibrillar tissue. The whole formation is in this way organoid, and in no way resembles adenomyosis but strikingly resembles epididymis. I published a study of this tumor later on (*Zeitschr. f. Geb. u. Gyn.* 49 [1903]). This case was decisive for my renunciation of von Recklinghausen's theory of adenomyosis as a whole. I criticized it point by point so that the theory was generally and definitely abandoned.

In the Berlin Society of Gynecology (1902) I demonstrated the relatively high development of the Wolffian duct in cases of uterus duplex and unicornis. In such cases there often occurs a defect of the umbilical arteries on the side of the defect of the Müllerian duct. At the same time I showed such anomalies in the structure of the Wolffian duct in fetuses and newborn children as multilayering of the epithelium and papillary formation of the same. I also pointed out cysts and channels of the Wolffian duct in the parametrium close to the uterus; one of them, in an adult, was filled with papillary growth. In another adult the Wolffian duct showed adenomatous growth in the uppermost part of the vagina

surrounded by a special musculature. For the second edition of Veit's *Handbook of Gynecology* I wrote one chapter on myoma and a second on sarcoma, endothelioma, and heterologous mixed tumors (Vols. I and III Wiesbaden 1902). This was the basis for the discussion of the same topic in W. Stoeckel's *Handbook* (1930).

In 1902 (*Zentralbl. f. Gyn.* Nos. 22, 36) I discussed the problem of intra-abdominal pressure and came to the conclusion that it is not uniform but different at various times and at varying places.

In the same year I published (*Zeitschr. f. Geb. u. Gyn.* 47) a case of persistent ureter at the lower blind end of the Wolffian duct which by the secretion of urine was dilated to a cyst duct lying in the left lateral utero-vaginal wall in a newborn child. (The same malformation was also found in the adult.) In pursuance of this case there followed in 1903 (*Zeitschr.* 49) a discussion with the zoologist Fleischmann concerning the normal development and the phylogeny of the urodaeum. Fleischmann came to the important conclusion that the difference between the lower amniotic animal and the mammalians was much too great to make them comparable with one another. A phylogenetic derivation of the latter from the former was held to be impossible. I have proven that this is a false conclusion because the common opening of the urodaeum in the sauropsides is divided into two openings by the septum urorectale in the cloaca.

In another field I worked on ectoderm cyst in the ligamentum latum, in the plexus spermaticus, and in the epididymis of fetuses and newborn children, which I explained as remainders from the period at which the Wolffian duct is formed under the ectoderm (*Virchows Archiv* 168 [1902]). They have, it seems, no special importance for pathology but they undergo regression. Another finding in that region mostly in adults (*Virchows Archiv* 171 [1903]) is frequently that of serosa-epithelial proliferation and formation of nodules on the posterior surface of the tube and mesosalpinx and of the anterior face of the meso-ovarium where they touch one another but not on the ovary. The nodules, of the size of millet seed, occur very often after tubal pregnancies but also beneath simple adhesions. In tubal pregnancies they grow as quite a diffuse proliferation. As migrating cells they invade the fibrinized and then organized blood coagulum and at the same time the softened tubal wall. Whoever does not know this might make a diagnosis of carcinoma. Later they are reduced to some smaller solid nodules

which in the center become liquefied and have a cystic appearance. I know hundreds of such cases but never have I seen carcinoma originating from that proliferation, nor has such a case been described in world literature. These epithelial nodules and cysts have the special fate of being detected again and again under different names. The same nodules of the serosa I found in the corresponding places in the male, always under adhesions. This type of reaction is limited to the tubal and surface epithelium of the ligamentum latum and should not be connected with Brenner tumor, which does not occur in males but only in the ovary; this will interest us later.

In 1903 I published a study on struma ovarii confirming L. Pick's idea that it was of teratomatous origin and had choked most of the other tissue. The struma ovarii contained iodine in chemical examination (*Virchows Archiv* 103). This was confirmed later by other authors.

Adenoma and carcinoma in the cervical wall may arise from the Wolffian duct. The first case described by myself (*Virchows Archiv* 174 [1903]) was easily diagnosed by its connection with the Wolffian duct which entered the uterine wall as a simple canal with a thick muscular coat. This dilated to an ampulla with extraordinarily rich branching and transits to a carcinoma. Later on, this case was the pattern for other cases of adenoma and carcinoma of the ampulla of the Wolffian duct in the lateral wall of the cervix described by myself, Rockstroh, a student of mine (1905), and others.

Histological abnormalities at the caudal end of the fetus (*Virchows Archiv* 180 [1905]) consist of many kinds of embryonic tissue such as remainders of the chorda dorsalis and of the caudal spinal canal which normally undergoes regression, and of the persistent neurenteric cord, i.e., of the primitive streak, and as remnants of the tail gut which also normally degenerates. Twice epithelial cysts were found ventrally to the coccyx and twice dorsally. The islands of cartilage lie ventral to the coccyx and are to be considered as phylogenetic remnants of similar but larger supports of the monkey-tails. All these findings could proliferate from simple cysts and other tissues but can also form complicated tumors.

In the same work I also described some special glands in the rectum. In the so-called zona intermedia, which belongs partially to the ectoderm and partially to the entoderm, one finds rather often single coiled glands, of which many go as tubules through the circular musculature, some-

times also through the longitudinal muscle layer. Those glands occurred in sixteen cases (25%) ranging from fetuses of five months to children of fourteen years. I found a special group of tubular glands above the sphincter externus. These lie just in the midline of the ventral wall, consisting of two or more tubules of special length in a common connective tissue coat, which, accompanying the glands, interrupts the musculus sphincter externus. One would expect that they might easily become infected.

A double monster with one normal head and one anencephalus without any trace of adrenal tissue was demonstrated in the Berlin Gynecological Society (1906). The normal brain had no influence on the hypoplastic anlage of the adrenal. Benign chorion epithelial invasion of the uterus was often erroneously diagnosed as chorio-epithelioma malignum. I have pointed out this error since it frequently occurs with invasion deep into the musculature and into the vessels, especially in cases of retention of parts of the placenta. When villi are not found after three or more weeks in a well-done curettage, but chorionic cells are present, they are very suspect of malignancy (*Zeitschr. f. Geb. u. Gyn.* 58 [1906]). This was misunderstood by J. Veit and has caused many authors to repeat his error. Such mistakes happen too often because it is easier to believe the reference than to look for the original. In my more recent work in the "Handbooks," I have combatted that erroneous criticism.

In 1907, I wrote in *Virchows Archiv* 187 on the "Anatomy and Development of the Double Ureter." This is important for the urologist because the ureter going to the upper part of the kidney should open deeper into the bladder than does the ureter which supplies the lower part of the kidney (Weigert). When they open at the same level the upper one must open medially to the lower ureter (R. Meyer). This is called Weigert—R. Meyer's law, but it is only a rule to which there exist a few exceptions. In my last work I gave this topic special attention, as I will show later.

I had, on occasion, seen and heard Virchow as the President of the Berliner Medizinische Gesellschaft and was deeply impressed by his clarity. He had accepted from me a short article on osteoid tissue in the cervix of the uterus (*Virchows Archiv* 167 [1902]). I asked for the genitals of a six-year-old orangutang which he readily gave me. I found in the uterus of the orangutang, exactly at the same place as in a new-born girl (1899), an island of endometrium in the middle of the posterior wall

of the fundus. I do not know whether that happens more frequently in orangutangs or other primates.

Virchow died that same year, in 1902. He is known the world over as the founder of cellular pathology, or should be known as such. It was a logical continuation from Schleiden, who recognized the cell as the element of the development and morphology of plants (1838), to Schwann, who recognized the cell as the element of the normal tissue in animals (1839), and to Virchow (about 1852) who was the first to describe the pathological proceedings as changes of the cells. In 1858, he published his *Cellular Pathology,* in which he called the cell the ultimate formative element of all life and, at the same time, designated illness as due to physical and chemical changes of the cells. This ingenious doctrine was revolutionary. It brought medicine out of the humoral way of thinking to the realization that we must look for physico-chemical changes in the cells themselves. This was a concrete theory on which everyone could build. It was the localization of disease in special cells which first gave medicine a firm basis. It is less known in this country that, in the Prussian "Landtag" and in the German Reichstag, Virchow played a major role in the liberal democratic party and that it was he who organized public hygiene in Berlin.

Virchow was a great philosopher, who knew the history of his field as no other man. Whoever is interested may read the lectures on general pathological anatomy (1855-1856), the chapter "History and Development of the Discipline," or the first chapter of his *Collected Treatises on Scientific Medicine* (1856). This all-comprehending intellect was mistaken however on the doctrine of cancer, which, in Virchow's opinion, arose from connective tissue. Thiersch in 1865 and Waldeyer in 1872 corrected this error.

Carl Ruge worked under Virchow and in 1869 won the university prize for an excellent work on the pathology of bones. He was born in 1846, the son of a physician and a nephew of Rudolf Virchow's wife, who was the daughter of Doctor Carl Mayer, a famous gynecologist known for the pessary he applied in descensus uteri.

After the war of 1870-1871, in which he participated, Carl Ruge became an assistant at the university Frauenklinik in Berlin and when the clinic acquired a new home with its own pathological institute in a separate building (1887), he advanced to prosector. In spite of intensive activity as a general practitioner, he stayed there until 1912, when I became his

successor. Together with Veit he introduced the biopsy as "the only possibility of early and certain recognition of cancer" of the portio (1878) and of the corpus uteri by curettage (1881). He had to struggle strenuously, especially against Hegau (Freiburg), to persuade his adversaries of the utility of this method and had, on the occasion of a meeting of the German Gynecological Society in 1888, to warn gynecologists to make themselves independent of the pathologists and to learn his method for themselves. Ruge had to struggle also for recognition of the adenoma malignum which was held not to be a cancer, because a cancer had to be a solid formation! The name was not invented by Ruge but by Eberth-Gusserow (1870). There exists, indeed, an adenoma malignum which destroys the whole cervix without losing its unilayered epithelium. But the name was designed only for the biopsy specimen which had not yet shown the multilayering of the carcinoma.

My acquaintance with Carl Ruge began in 1897 and lasted more than twenty-nine years as a cordial friendship. We were related by his daughter's marriage to my wife's brother. At their wedding there were one hundred and eight relatives of the Ruges, and the widow of Virchow whom I had the honor to take to the table at the dinner party, a very amiable lady in spite of her more than eighty years.

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Now back to my home. My wife recovered quickly from the second operation. Together we visited Italy for two months (1901), and this was the culmination of all the trips we used to make every year. We enjoyed all the wonders of ancient and modern art and worked very seriously at seeing as much as possible in that short time.

After the trip I read Zola's *Rome* once more with much better understanding. This man's understanding of the life of cities is amazing. By the way, to those who do not like him because of his realism I recommend two of his works where his poetic phantasy is admirable, *Une page d'amour* and *La Faute de l'abbé Mouret*. I was deeply moved by these books.

Sometimes we went to Switzerland where I could hike to my heart's content and climb mountains but not in the way some fools do. We also came to know a great part of Germany.

Among our very good friends in Berlin there were Conrad Ansorge the musician, also known in the United States, and his wife Margarete Ansorge. In their home we learned to know poets and painters and many

music lovers, among them C. Schleich, who played the violoncello in a masterly way and was the author of a little book called *Sunny Past,* a best seller at one time. He was a good friend of Strindberg with whom he had in common, although you may not believe it, an inclination to mysticism, alchemy, and alcoholism. Although he was artistically gifted he was not an artist by profession but a surgeon who invented a local anesthetic (1892), a soap with marble dust (used by surgeons for a long time), and other well-known products. It was my fault that we were not good friends. I could not stand his theatrical manner and his posing as a genius. Conrad Ansorge was a lovable man, a poet as well as a musician. He and his high-minded wife, also a fine pianist, often came to our home and I recall with the greatest pleasure the sublime art they produced there. Once with Pablo Casals, with whom we were friendly, Ansorge played on the piano part of a sonata he had composed for the 'cello, and Casals sang the 'cello part *prima vista.* Casals is one of the most cultivated people I have ever known, and modest too.

The Ansorges had two boys and two girls about the same age as ours. We had the best times when I took the six children to make daring excursions on Sundays. We were up to our tricks and the children treated me as their contemporary. In my mind I remained young a very long time. When they were fourteen years old my son became "engaged" to the older Ansorge girl. Both mothers were sublimely happy but it did not last very long. I had spoken sensibly to my boy and let him go to the country estate of Carl Ruge, who had two beautiful nieces. The older one was fourteen years old. He had some more love affairs after that.

How I Became A General Pathologist

In 1903 I read an article by a pupil of Otto Lubarsch who was then a pathologist at the Academy of Medicine in Posen. Lubarsch was an extremely clever man, gifted with sharp logic and equipped with training in biology and pathology. He edited later *Virchows Archiv* and wrote a textbook on general pathology. In Germany and Europe this term is interpreted differently than in America. What you call a general pathologist is a man who works in all fields of special pathology. We distinguish general pathology as the doctrine in general from special pathology which is concerned with the morbidity causing various illnesses, the constitution, heredity, hypertrophies in general, inflammations, tumors,

metabolic changes, and so on. Lubarsch did not finish his work, although he worked constantly. Winter and summer he appeared at 6:00 A.M. at his Institute and even examined candidates so early in the morning. He founded, and edited until the end of his life (1933) together with the veterinarian Ostertag, *Ergebnisse der Pathologie* (*Results of Pathology*). This is the finest periodical in pathological research on humans and animals. The editors demanded of the pathologists that they write a whole chapter in the special fields in which they were recognized as experts. It was, actually, a collection of monographs. Lubarsch was a belligerent man and a very active member of the university. He was a passionate nationalist and had many troubles wherever he was, in Breslau, Posen, and Kiel, before he came to Berlin, after L. Aschoff had declined to come there. Lubarsch was very critical as well as quarrelsome because he thought he could improve men and conditions. Although he was so critical, he was not always logical. He was an ardent scientist and an intimate friend of Semon. He came to pathology at a time when Virchow's system suffered the first thrust from bacteriology instead of absorbing it. At this point Lubarsch came in with his work to earn the reputation of the mediator between the one-sided parasitic etiology and the "capability of the organism to reaction."

I wrote a letter to Arthur Stein, a pupil of Lubarsch and later a gynecologist in New York, to the effect that I could not agree with his diagnosis—a carcinoma of the Müllerian epithelium—of a case he had published. Since he was at the time in Heidelberg and did not know what to answer, he sent my letter to Lubarsch who wrote me that the diagnosis was his own and that it was based on studies which I could not know because they were published in *Virchows Archiv*; and he also wrote other offensive and inaccurate statements. The letter came from Berlin, and half an hour later I visited Lubarsch at the home of his mother. At first he was very haughty, but I had one of my publications with me, a reprint of which I had sent to him and in which I had quoted the works in question. I said I was very sorry he had not read my publication, otherwise he would have mentioned it in his newest work in the *Ergebnisse der Pathologie*. That was, indeed, brand-new.. I told him that it was not his personal fault but a general weakness of pathologists that they knew embryology only from text books; and that I would like to demonstrate to him the development of the Wolffian and Müllerian ducts with a few drawings to show him that his view was wrong. I did so and eight days later a

letter came from Posen in which he asked me to write about embryonal failures in the female sex organs for the *Ergebnisse*. I accepted and one year later I submitted about two hundred printed pages in a critical review of the entire subject. I was a general pathologist and the pathologists asked, "Who is Robert Meyer?" For I was still a private practitioner and still had "Physician and Obstetrician" on the brass plate of my house door. Lubarsch was proud of having discovered me.

Beginning with 1902 I was an officer in the Berlin Gynecological Society and in that capacity had heated arguments with Carl Ruge and Olshausen about the admission of female gynecologists. Agnes Bluhm was the first who dared to ask me to propose her name for membership. She was a well-known author of publications in biological research in the Kaiser Wilhelm Institute in Dahlem. She was elected and others soon followed. The society did not perish.

1908-1911

In March 1908, Dr. Lippmann, assistant to Professor Bumm, called on me to ask whether I would like to take over the laboratory of Bumm's Gynecological University Clinic at the "Charité" with the title of professor. I was so surprised by this unexpected offer that I asked for three days to think it over. I was an old man of forty-four years, wasn't I? On the other hand I would be supplied with a technical assistant who would be engaged for life and I should no longer have to pay for my own laboratory. I knew Bumm as President of the Gynecological Society and knew him to be a man of the world with whom it would be easy to work. I entered the clinic and definitely removed the brass plate from my door.

In the year 1909 I wrote (*Arch. f. Gyn.* 89) on placenta "extrachorionic" or marginata, i.e., independent of the chorionic membrane. The large placental vessels stop suddenly and do not touch the margin of the placenta but the villi of the placenta grow further, i.e., extrachorionic in the peripheral decidua. The membranes of the ovum are not adherent to the extrachorionic margin. The placental villi can augment in number in three ways when it is necessary for the blood supply of the fetus. The extrachorionic way is the most frequent and easy to recognize if one pays attention to the margin of the placenta. The second way is the placenta capsularis. For this it is necessary that there exist a decidua

capsularis with sufficient vessels to warrant a maternal blood supply. This happens at an early stage, when the egg sinks deep enough into the decidua to form a part of the capsule. The third way is that of increased thickness of the placenta. This is afforded mostly by invasion of the vessels of the basalis.

In 1910 I wrote on the development of changes of the epithelium of the portio and cervix (*Arch. f. Gyn.* 91). According to my new concept, the sinus epithelium grows into the Müllerian vagina to replace the primitive Müllerian epithelium. This goes on into the cervical canal ripening to squamous epithelium until the remaining part of the Müllerian epithelium in turn begins to ripen to mucous epithelium and, advancing towards the os externum, dissolves the squamous epithelium. There is no metaplasia either of the Müllerian epithelium or of the squamous epithelium. In the sixth month of fetal life the cervix infra-vaginalis is fully occupied by the vaginal sinus epithelium but at the end of the fetal life it is already repelled to the external os and very often to the outer surface of the portio. Remainders of the basal cell row are found in many cases in the cervix infra-vaginalis as well as higher in the cervix supra-vaginalis. Beneath the normal cervical epithelium one may see the basal cells singly or in rows. The stage in which one finds the mucous epithelium on the outside of the cervix is called the "pseudo-erosio congenita" or "congenital histological ectropium." After birth, in girls until eight years of age, I found the pseudo-erosion mostly regressed and in the cervical canal the squamous epithelium is again predominant.

In July 1908 I was designated "Professor." My assistant, Dr. S. Aschheim, was the first to read the news in a newspaper and he used to remind me that my first words were "Ah, that will please my old mother." I tell this because it is characteristic both of my mother and myself. I knew that I could not give her greater pleasure, since she, like many mothers, was ambitious for her second son after the oldest, by his premature death, had ruined her hopes that he should become a great poet. He never had shown real talent as a poet, but my mother was born in Frankfort-on-the-Main where the mighty influence of Goethe persisted in the minds of youth. It seems that her mother was similarly affected because she gave her the rare name of Bettina after Bettina von Arnim, a friend of Goethe. Certainly her most remarkable quality was her imagination. She invented thousands of gadgets and larger things as well, but only in her imagination; thus she had already dreamed and spoken of

the dirigible many years before Zeppelin. This invention she had had in mind all her life and when it was announced that Zeppelin would come from Friedrichshafen on the Bodensee to Frankfort-on-the-Main for a great electric exhibition, my mother came from London to Frankfort to see it. That pleasure crowned her life; she felt as if she were the creator of the Zeppelin. I suppose that I inherited a little of her inventive imagination, for in every field of science an imaginative faculty guides the mind of every creative spirit. The only difference is that the scientist must have the critical approach to discern truth from fiction. My mother died in 1910, a very good mother of her five children and nine grandchildren.

All during this period and before and after, we went to good stage plays, operas and concerts, also to a concert given by physicians who had a good conductor. With my wife and children we took excursions by steamer on the many lakes which surround Berlin. One could eat in one of the thousands of inns and restaurants scattered all over the region. Some of them were elegant and even famous for their good food and wine. At one place thirty or forty thousand people in one crowd could be found bathing and swimming. Other lakes were more quiet. But almost all were full of rowing and sailing boats. One has to live very long to see all the waterways, lakes, and the Spreewald in the surroundings of Berlin. The Spreewald is a large network of canals, some wider, some narrower, formed by the Spree river before it reaches Berlin. It branches out into more than one hundred rivulets. For more than twenty-seven miles it meanders through meadows and woods, then to merge again into one riverbed. You can pass through the woods of the Spreewald by boat only. The people who live on the outskirts of the woods are the "Wenden," or Sorbs of Slavic origin who also live in some parts of Brandenburg and in a part of the former Kingdom of Saxony. They speak their own dialect and have their particular religious worship. They wear wonderful costumes and many of the women come to Berlin to serve as wet nurses. The Spreewald inns also were famous for good fresh eel with a white sauce and the best fresh cucumbers. To spend half a day in a boat in the Spreewald was a real recreation.

In the year 1908 I described extensively a Holocardius acephalus, a so-called amorphus. In my view, and that of others too, the normal twin occupied the chorion providing for blood supply earlier or to a higher degree than the other, which is closely related and defective, being de-

pendent on the primary and, eventually, on some secondary anastomoses, through which the blood circulates in opposite directions.

In the German Pathological Society (1909) I spoke about the displacement of the phallus, penis subcoccygeus, and clitoris perinealis and their importance for the developmental physiology. The corpora cavernosa influence the ectoderm to produce a glans at any place where they touch the skin. In my cases the corpora cavernosa arose from their normal place at the tubera ischii, but were displaced by the abnormal shape of the pelvis.

In the continuation of my studies (erosion and pseudo-erosion in adults, *Archiv. f. Gyn.* 91) my friend Fred L. Adair participated by sectioning 57 cases of erosion (*Surg. Gyn. Obst.* 10) and I followed with 75 other cases, cut in a series. In contradiction to the pseudo-erosion of the fetus, I never found those of adults without inflammation, not even those of girls of 15 to 19 years of age. A true erosion is very rare, although every pseudo-erosion begins as such. Erosion means a break in the surface epithelium. The pseudo-erosion is already a first and provisional stage of healing. Cysts are always suspect of an old erosion. Most erosions found at the portio are already recurrent at least in part. The glands of erosio glandularis originate in the neighborhood and grow heterotopically inside the connective tissue and break through to the surface. Real glands originating from the surface are also formed. Definite healing begins when the inflammation ceases and the soil at the surface is dried out. Then first the squamous epithelium from basal cells grows in from the periphery or from old islands which persist between the glands and fill them. It grows between the cervical epithelium and the connective tissue. It may grow rapidly in one basal row or slowly by increasing to ripe squamous epithelium. Metaplasia of any kind does not happen. In daily examinations over 35 years, I never have found metaplasia.

One cannot work on this topic without understanding and reading German. I have demonstrated my results at the invitation of the Hamburg Biological Society and in the German Pathological Society. In Henke-Lubarsch I have included but a small abstract of the work on erosion[1] (1930). I translate here some definite conclusions at the end of Chapter XIII on "Erosion":

> Finally, everybody has to choose his point of view; one may acknowledge that exact proof is lacking, or may comprehend that the process as such in its particular points is not as evident as the putting together of the detached parts of a puzzle.

But here the ways separate and when no expedient is found we shall, depending on our fancy, adhere to the consideration of single pictures or we shall try to integrate them into a process. The reasons for which we combine them in a special succession one can weigh, contest, or make probable. And the greatest probability will assert itself successfully. We may recognize the attempt to arrive at a reasonable solution as one aim of the so-called exact science, but this is not the aim of any biological science. The point is rather to get an idea of the process and one scarcely will (to keep to our example) be enthusiastic over a solution of the procedure in an erosion. Pathology will always remain biology and as such will never be more accessible than in a connecting "view" of the items of a proceedings brought together in a total by means of images or comparisons. A cinematographic representation of the proceedings of an erosion from beginning to end would be clearer for most people and give them a clearer view even without casual accessories than the analysis of the irregularities in the causal events which ends in numbers. Granted the highest perceptive faculty for the relation of numbers, these would represent the most inconsolable and absurd "view" of biological processes.

About 1909 W. Felix of the Department of Anatomy in Zürich, Switzerland, visited me to see my collection of embryonal series. At his request I loaned him more than sixty series, which I had made myself, for his studies on the development of the urogenital organs. I knew him as an extraordinarily gifted and experienced student in this field and I did not know when I should be able to do the study. I did not regret it because he made serious use of the material for Keibel-Mall's *Manual of Human Embryology* which appeared simultaneously in Germany and the United States in 1912. Often I had visitors who liked to see me or my embryos. Among them was Dr. F. Keibel who came frequently for his "Normentafeln" of embryos; and also from the United States came F. Mall and Herbert Evans, who was then a slender man, so that I could not recognize him thirty years later.

The embryos which Felix had finished studying he used to send back singly or in groups, so I often had to go to the customhouse. One day I let the customs officers worry about a consignment, whether it would be better to declare them as glassware or as meat preserves. After letting them argue long enough, I told them they would find it under "animal preparations for scientific purposes," and that it was duty free. That proved to be correct, but an official who had a special thirst for knowledge asked me what those things were that were lined up there in rows. "Embryos," I answered. "What do you mean by embryos?" he queried. "Human beings from two to ten millimeters." "No!" he exclaimed in greatest astonishment, "what cannot happen in a customs-house!"

I was with Bumm up to the time of his transfer to the University

Gynecological Clinic, called "Artilleriestrasse." I remained for another two years with Professor Franz, Bumm's successor. He was an extraordinarily skillful operator, had sound horse sense, and did not discuss what he did not understand. We were very good friends and talked shop coming from the Gynecological Society, stopping for a glass or two of beer. Our common interest was menstruation. He died later in the prime of his life, of a disgerminoma testiculi.

In 1911 my study on the human corpus luteum appeared. I demonstrated for the first time an early stage which was until then unknown because it is not yellow. I called this the stage of "proliferation" and the next the stage of "vascularization." These stages precede that of "organization" and that of "blooming" before pregnancy or regression during menstruation. This work found general and enduring recognition.

On the occasion of the International Gynecological Meeting directed by Bumm, I arranged a whole roomful of specimens collected from both the University Obstetrical and Gynecological Clinics, among which the most admired specimens were those with injected blood vessels made transvisible by the method of Spalteholz which was new at the time. There were also many chromomicrophotos of embryos and embryonic failures, and drawings, among which was a chorion-epithelioma. The whole exposition was listed in a printed catalogue, of which everyone received a copy. Two Englishmen came in a hurry to that room, found the chorion-epithelioma, and crossed it off in their catalogue, just as is frequently done in the Louvre with the Venus of Milo, and rushed out. They had never seen a chorion-epithelioma because in England it was not generally recognized until 1907.

During those years I also published a work on the Wolffian duct, especially in the vagina and in the hymen, in *Archiv. f. Mikroskop. Anat. u. Entw.* (1909 Vol. 73) edited by Waldeyer. He then asked me if I would not like to become Privat-docent of anatomy, but I was not ambitious except for my work. Waldeyer was the anatomist who had first proved that cancer arises from epithelium. He was a very clear-minded man, who introduced the name chromosome for the carrier of the inherited qualities (1888) and formulated the neuron theory for the development of nerves (1891); he also wrote a large monograph on the topography of the pelvis in which he described in an unsurpassed manner, the genitalia of the male and female (1899). At the same time I investigated the development of the male genitalia. I worked on a vast

amount of material. The pathologists said "Meyer has become a pervert." In 1909 there appeared in the same *Archiv* a work on the utriculus prostaticus and in *Archiv f. Anat. u. Physiol.* a work on the development of the male urethra and the preputium. I published an article on the pronephros and the nephric intermediate blastema (Schreiner) in *Charité Annalen* (1911), and one on metanephric tissues in the inguinal region in *Virchows Archiv,* and on congenital abnormalities of the kidney in *Zeitschr. f. urologische Gynäk.* Finally, in 1911, I published in the *Ergebnisse der Pathologie,* at the invitation of Lubarsch, the voluminous chapter on embryonal tissue anomalies in general and especially on those in the male sex organs. In this work I criticized all that had been written concerning tumor formation in general and especially about the embryonal tissue abnormalities in the male sex organs, including adrenal tissue, mesodermal tissue, mixed tumors, teratoma, and teratoblastoma. Instead of many ideas which confused the chronology of development and operated with physiologically impossible factors, I introduced the conception of an unusual cell connection based on visible facts and explained the aberration of tissues. I criticized the manifold theoretical ideas of (1) dedifferentiation and metaplasia; (2) abnormal persistence; (3) embryonal heteroplasia (dysplasia); (4) atavism; (5) aberration of tissues; (6) the fate of embryonal enclosure; (7) their relation to tumors. This work of more than two hundred printed pages was rated highly by pathologists. Since that time the word metaplasia has been applied with caution and the word anaplasia has been forgotten in German medical literature.

I demonstrated three hundred autochrome-diapositives on this topic at the first International Exhibition of Hygiene in Dresden (1911) and at the German Pathological Society in Strassburg in 1912, and I referred in the *Zeitschr. f. Gyn.* 1912 (*Festschrift f. J. Veit*) to the same topic in the form of a monograph. This work was done to show that there do indeed exist many embryonal tissue failures in the whole fetus to confirm Cohnheim's theory of the genesis of tumors but that not all failures could produce tumors, otherwise everybody would have one. Only a few of them could do that, when they proliferate without differentiation. This theory should bring us nearer to an understanding of certain tumors. The embryonal tissue malformations stand facultatively in relation to many tumors. The indifference or immaturity of cells is necessary for tumor formation, but most embryonal tissue failures ripen to normal tissue.

1912-1914

In April 1912, I went again to Bumm in Artilleriestrasse as Prosector of the Pathological Institute and as such succeeded Carl Ruge who had retired but, at my request, kept his special room for his private examinations. Bumm was an artist and had planned to become a painter before he studied medicine. It was astonishing to see him at the blackboard with a piece of white chalk in one hand and a red or blue one in the other, simultaneously drawing with both hands a picture which always gave a clear view of the situation in question. His textbook on obstetrics was the best of that time. He was progressive and therefore always ready to change his mind for the benefit of his patients.

At that time my name was well known in gynecological and pathological circles. I had no ambition to become popular. That would have been easy if I had visited the Berlin Medical Society, where everybody with a name had to talk. Lubarsch once called it the "Medical Exchange." But sometimes I went there when something important was announced; for instance, when Virchow spoke or when, after twenty-five years of official cancer research, the representatives of internal medicine, surgery, and pathology declared their bankruptcy. Has it changed since? Otherwise, I did not attend that society so that W. His, Jr., who was an internist at the University, told me that I was the most invisible man in Berlin. He was right.

On the occasion of an international meeting of urologists in 1914, I demonstrated upon invitation 250 microphotos on the study of the development of the male urethra and preputium with a short description of my results. With Moraller and Hoehl, I edited an *Atlas of the Normal Histology of the Female Genitalia* (Leipzig 1912). This *Atlas* contains more than 160 colored lithographs and has not been surpassed. In the *Arch. f. Gyn.* (96,) appeared my work on skull anomalies of newborn children, especially on development failures like the inca-bone. The results of microscopic examination of an epignathus appeared (1912) in the *Zeitschrift*; and the normal and pathological ossification of the pelvis was published in 1912 (*Anatom. Anzeiger*). Sobata, a student of mine, found in fetal pelves made transparent three pairs of ossification centers which appear in the os ilei of the fetus of 3-6 cm. where the "corpus" ilei crosses into the shovel, the second in a fetus of 18 cm. on the os ischii at the borderline of the corpus to the ramus superior, and the third in the

os pubis in fetuses of 23-33 cm. Others are found in the vertebrae. I found microscopically in other fetuses deposits of calcium in the hyperemic area of ossification, which sometimes involves the musculature. This impregnation which is not striking is found relatively often at the os ilei near the articulatio sacroiliaca in 5-9 cm.-long fetuses. Research should follow up what happens to these calcium deposits.

In that year I also published in *Virchows Archiv* fifteen cases of anencephalus and four cases with high degrees of exencephalus in which the adrenals were defective; in six cases no adrenals were found and in three cases they were too softened for microscopical examination. In the remaining ten cases the inner layers of the adrenals, the zona fasciculata, and the reticularis were defective, while the zona glomerulosa was well developed and rich in lipoids. The medullary portion in five cases was hypertrophic and well developed. Morphologically the adrenal was normal in the anlage and may have been normal until the fifth month.

In the year 1912, I wrote: "Does Inheritance of Acquired Characteristics Occur?" This question I had to answer in the affirmative for long and indefinite periods of time, but in the negative for short intervals of time.

My interest in general questions which are not directly answerable but which aroused the speculation of a generation of scientists I expressed in the "Problem of Heredity of Acquired Characteristics" (*Deutsch. med. Wochenschr.* 1910, No. 23; *Berliner klin. Wochenschr.* 1912, No. 52). Many authors reasoned that our belief in the inheritance was not tenable, nor even imaginable. These authors would not believe that one and the same stimulus could evoke somatic changes and simultaneously influence the sex cells so they could produce the same somatic changes in the descendants. Another moot point involved the question whether our notions of expediency or suitableness are anthropocentric and inapplicable to nature. Nature is supposed to create casual variations of which the suitable survive and the unsuitable become extinct. But how could the sex cells experience what is suitable and what not? The principle of "selection" is assumed to be equivalent to "expediency," which is, however, not thinkable without the human brain. What is "not thinkable" and why is it "not thinkable"? Could a general principle exist in nature similar to that of the human mind? Because human beings think in terms of expediency, could it not be possible that nature also works in that direction? But is that logical or correct? However is it not striking that hollow organs are

prepared during development to serve vital functions in post-fetal life? Not only are they extensible for variable volume but they contain muscles in a prescribed amount and the arrangement necessary to fulfill specific requirements later. Is that not an inherited disposition? The orientation of all important organs—eye, ear, nose, mouth with teeth and tongue,—is anterior. The anus is located posteriorly without such organs. Could the fitting together of the sexes, the millions of chemical processes working into one another be left merely to chance? How many times mere chance must have operated to bring about such a reasonable organism, in which every tissue works in unison with the others. It seems to me quite apparent that the primitive organism, as long as it can be influenced by environment, reacts reasonably with a direct tendency towards utilization of its environment. From the very beginning there exists an irritability to "light and dark," to "warm and cold," to "noise and silence," to "good and bad taste," and a response to "conduciveness." If environment affects the senses, the sensibility must precede reaction, namely the sensibility to respond by the formation of organs suitable for access to environment.

Together with Ernst Schwalbe, the editor and author of *Morphology of Malformations,* I founded a periodical, *Studies of Pathological Development* (Berlin 1913). Schwalbe was to invite the pathologists to participate and I the anatomists, of whom several excellent authors throughout Europe had promised to help us. However, the war broke out and it was impossible to continue this work. One volume appeared in 1913 and the second in 1920. Both contained a number of remarkable studies. I myself contributed three, of which we shall hear later.

A logical consequence of my study on the corpus luteum was a publication by Robert Meyer and Carl Ruge, Jr., little known in the United States, treating the chronological order of corpus luteum formation and the menstrual cycle in which the corpus luteum is the major factor (*Zentralb. f. Gynäk.* 1913, No. 2). Through this publication, it was established for the first time that the cycle in the corpus luteum and that in the endometrium belonged lawfully together. We worked on 82 cases and announced that the ripening of a new follicle occurs in a period of 8 days after the onset of menstruation. The onset of luteinization was observed as early as the second week; the highest point before menstruation occurred at the end of the third week. The regression of the corpus luteum was found at the time of menstruation and lasted (very irregularly) about 14 days. The corpus luteum was considered to be the leading

factor. After this short communication, there followed an extensive study by Ruge. Some months later, R. Schroeder came to the same conclusion. He studied this topic, as is generally known, in his excellent works, especially in Veit-Stoeckel's *Handbook*, and has the merit of having enlarged and popularized this knowledge.

A publication of mine on the relationship between the egg cell and the follicle apparatus (*Archiv. f. Gyn.* 1913) is still worth reading because it shows how far histological studies are able to answer biological questions. There are also some uniform findings published on abortive corpus luteum and on accessory forms of corpus luteum and the luteinizing effect of pregnancy on the follicles as a forerunner of the effect of chorion epithelioma and mola hydatiformis. George W. Corner has described similar things in the ovaries of monkeys.

Another topic which I discussed in the Gynecological Society in Berlin concerned ovarian tumors. My interest in this topic goes as far back as 1903 (struma ovarii) and other demonstrations followed in succeeding years, but it began to intensify with my work on adenoma tubulare malignum ovarii in the German Pathological Society (Munich 1914). I showed the malignant form of Pick's adenoma tubulare testiculare, unknown until then, which later appeared in our *Studies of Pathological Development* (1920). In both publications I described the malignant form of Pick's adenoma tubulare ovarii testiculare. In the *Studies of Pathological Development* I prepared pictures which show partially the typical arrangement of Pick's tumor in lobuli and therein the typical adenoma. In other parts this structure passes into solid parts. The tumor had broken through the capsule in one case; in another the patient died of cancer and cachexia but no dissection was made. In *Beitr. f. path. Anat. u. allgem. Pathol.* 84 similar pictures are found which are not so good as those in our *Studies.* In these works I discussed the theory of Pick according to which the adenoma arises from hermaphroditic parts in the ovarium. This seemed unlikely since other signs of intersexuality were missing. Among my cases one woman had even had three children. I stressed the possibility that the tumor arose from parts of the medullary tubules with unusually strong male character or from the rete ovarii in which I had found small adenomata.

In our new journal I published an article on achievements and aims in the field of embryonal tissue anomalies. Together with my work on adenoma tubulare carcinomatosum ovarii there also appeared a study on

the "Normal and Pathological Anatomy of the Medullary Cysts and Tubules and of the Rete Ovarii." These studies did not appear until 1920 because of the war. I pointed out that the medullary stroma has an irregular borderline towards the hilus and projects with some indentations into it. These have a superficial similarity to the pyramids of the kidney and, not infrequently, contain small cysts at the deepest points, the homologues of the tubuli recti testis. They are larger and found more often in adults than in the fetus and in children. In some cases I found them in communication with cystic parts of the rete. I showed a picture of medullary cysts in proliferation. In one case there were more than twenty cysts in one section alone which were not isolated but seemed to belong together. In some cases I found growing epithelium in papillomatous arrangement. The rete was found in 85 percent of females. I detected communication of the rete with the epoöphoron and seldom with the medullary parts of the ovarium. In adults it was an extension to 20 mm. in length. It grows even in old age. In one case I found an adenomatous structure of wounded tubules in the midst of the partially cystic rete. It reached into the medullary zone and contained papillae in some areas. The size of the whole proliferation was some millimeters and it was not encapsulated.

Another topic was "Carcinoma ovarii folliculoides et cylindromatosum" (*Zeitschr. f. Geb. u. Gyn.* 1915, 77). In this work I discussed seriously the histogenesis of the tumors in question from granulosa epithelium, not of the follicles or of the corpus luteum, but of the granulosa cells in various stages of development. There existed at that time only a few cases of granulosa cell tumors and the trabecular type was unknown. It was in this work that I arraigned the gynecologists and some pathologists because of their uncritical way of discussing histogenesis. At that time nothing was known about hyperplasia of the endometrium. Also, at that time, many different ovarian tumors were being looked for. I saw that the so-called cylindromatous type, which we now call trabecular, and the folliculoid type had the same histogenesis and occurred in the same tumor. I later recognized that the common factor was to be seen in estrin production.

In 1914 I was interested in the swindle of clairvoyance (*Berliner klin. Wochenschr.* 1914, Nos. 23, 32). This happened because I became indignant when Schottelius, the Professor of Physiology in Freiburg, wrote an article in a serious medical journal (*Jour. Psychol. u. Neurol.* 1913, 20)

about a man who could read the words on slips of paper which had been folded and put into various pockets. At that time it was alleged that certain horses and dogs could read and calculate. Spiritualism as a science was extraordinarily popular and under the guidance of a famous physician in Munich, Baron von Schrenk-Notzing, an international meeting had been planned for October of 1914 in Berlin. Many excellent foreign scientists had agreed to attend this projected gathering, among them W. Ostwald, the famous colloid chemist. There was a demand for some university professors from Berlin but many of them were not interested in investigating clairvoyance or were not courageous enough to declare themselves against it. In short, I was asked to attend the meeting as a critic, together with Prof. Moll, the psychologist. Unfortunately, war broke out and the meeting came to naught.

I arranged the slips published by Schottelius in the same way as he had described them and I showed them to the clairvoyant in Freiburg, where he was in prison. I also arranged them on a thin film. Nobody could read them. Neither could the clairvoyant although I did not hide them in my pocket but showed them to him. Nobody could read anything because by folding the papers double several times the letters became disarranged. This impressed everybody and I was allowed to see this man in his prison cell in Freiburg in the Breisgau. By a petition for pardon to the Grand Duke of Baden I got him free. The money I gave him he used to escape to Paris. But soon I found another man named Reese, from New York, who had a reputation for the same swindle; another swindler put me in touch with him and I visited him in Berlin. I exposed his tricks in a very short time in the same way which I described in the journal quoted above. Reese had been deceiving people on two continents for many decades.

It was not true that this swindler did not touch the slips as had been claimed; he exchanged them the first time for blank slips and then tried to divert my attention by all kinds of tricks. The possibility of deception by such tricks arises from ignorance of natural sciences, still more from defective observation and judgment, but chiefly from the inexhaustible imagination of human beings. The latter is the most interesting for the psychologist. The objective result of my studies was: "Mere nonsense." I tried to clear up all kinds of superstitions; my above-mentioned work will be found very interesting by those who do not believe in miracles. Richard Semon was enthusiastic about my articles and many other people

too. That was my consolation for the effort I spent or wasted on this matter. But superstition is ineradicable.

There are two kinds of thinking people. One kind can be satisfied only by absolute clearness insofar as possible; their thinking is not hindered by personal wishes. The other kind is guided by the unconscious wish to encounter something unexplainable, mystic, and even supernatural, which contradicts daily experience. Otherwise they have no genuine interest in objective truth. They are romantic personalities, artists of all kinds, especially those of the stage, but included are also great men of science. If you try to persuade them by logical discussion of the absurdity of their experiences they follow you willingly to a certain point. However, when they feel that they are being driven into a corner they suddenly become irritable or even hostile. There is something like an iron curtain between you and them which you are not allowed to pass. They do not want to be persuaded. And this is the most interesting point of that story which cost me so much time.

1914-1918

Meanwhile the war broke out. During the war I was a physician in a military hospital in a suburb of Brussels (Belgium). For the most part, we had to do surgery on war casualties but sometimes we suddenly had to change the character of the hospital. A telegram would arrive "Evacuate 400 beds for venereal diseases" or "200 beds for thigh fractures." We then had to look first of all for medicaments or instruments. During the first year I had 66 cases of tetanus among my patients, of whom 64 died. This was stopped suddenly by the prophylactic treatment of every wounded soldier as soon as possible. After that I saw only two abortive cases of tetanus, one with tetanic cramps of the face muscles especially, and one with tetanic cramps of the abdominal musculature. Both cases were cured.

Also during the same time I was prosector for a few forensic cases and some special cases like those of questionable death from cholera. We had no infectious diseases. They were sent to a special hospital. I provided our hospital inexpensively with some self-invented orthopedic apparatus which served our patients very well. I also had the X-ray laboratory. Sometimes we were excessively busy but generally it was an agreeable activity. Occasionally I had to transport insane men and conduct them to

a German hospital, or again to transport some 200 men with venereal diseases to Munich. When we arrived there after exactly 100 hours, there were only about 150 men. The rest had escaped in Bavaria. This trip I made to visit my family. My son was on the western front nearly all the time where I could visit him. He was wounded once and once he was very ill with dysentery and icterus. He had the worst "flu" I have ever seen with bilateral pneumonia in 1918. This was while he was in Sedan where I was allowed to nurse and care for him while all around the young officers died like flies. He had not the least recollection of my visit, because after the crisis I had to return to my hospital.

While in Brussels I realized an urgent desire, one I had had all my life, to become the conductor of a small orchestra. We played and sang parts of oratorios and had a professional soprano for the solo parts. We also played classical symphonies, overtures, and other works. That was a very great pleasure for all of us but especially for myself. After we had practised for a while I called on the government physician, who was the founder of the orchestra and sometimes moved to tears by its music, and asked for permission to give regular concerts for the nurses and orderlies of our five hospitals. These concerts were to alternate with instructive lectures. He was enchanted and at once began preparations so that we could give our first concert a week later. But what preparations! I was somewhat surprised to see gilded armchairs in the two front rows of the large hall. He had issued formal invitations to the military government with the Governor-General as the head and the government of Brussels and many other sorts of people. The guests were already starting to fill the hall when suddenly one of the musicians and the government physician rushed to me. They told me that the 'cello score was missing for all the numbers on our program. Highly excited the government physician wanted to know what I was going to do. "Send four cars right away, one to my house, two to the houses of the 'cellists, and one, first of all, to the academy of music where we rehearsed last night." I went on the stage and said calmly as if it were the most natural thing in the world: "Your Excellency, I must apologize for our beginning with the second piece on our program because the score for the 'cello has not yet arrived." Thus we began with a solo. Then I could say, "Your Excellency, the score for the 'cello has arrived meanwhile and the concert can proceed." The Governor General applauded kindly and the concert took its course undisturbed and we received impetuous applause. My government physi-

cian could not recover from the shock and said to me with painfully suppressed rage, "I would like to know what could disturb your calm." "So would I," I answered with a little smile. "But it was a wonderful concert," he said, and we shook hands. He was a good-hearted man and we got along fine together.

Finally we played publicly for the German colony in Brussels and earned enough money to buy new music. We had an enthusiastic audience and the reviews in the newspapers were not less enthusiastic. (I wrote them myself.) I accompanied a young girl violinist on the piano, a prodigy named Alma Moodie. She gave private concerts and concerts for hospitals; later she gave recitals in great public concerts. Occasionally I accompanied Miss Zur Nieden, an opera singer from Berlin who gave a concert for the soldiers of the garrison in Brussels.

There were many young doctors in our hospital with whom to play music or chess or bowl in the evenings. There was only one old man of about sixty-five or more with whom nobody could get along because he knew everything better than the doctors. Thus constant friction prevailed and there were silly jokes about him. The man was almost as broad as he was long, and he had a short neck too. He painted quite nicely and was always in his dressing gown when in his room with a fly-swatter in his hand to kill the abundant flies. One day he came down with severe pneumonia and I was told not to try to cure him since it was certain from the start that he would have to die, but to take care of him. He was so heavy that nobody could lift him. We put him on a surgery bed equipped with a handle and a bell so that he always could call for somebody. After three days of illness he was already so weak that he could not even do that any more. The death struggle had begun. I happened to be in the room when a big fly alighted on the tip of his nose. He was too weak to chase it away. So I did it and the fly settled on the bell handle. Now I had to catch the fly and approached it cautiously. He followed every one of my movements, the cold sweat on his forehead already and no longer breathing. The moment I caught it the bell rang and he smiled happily for the last time. He had forgotten about breathing. When I described his death to his wife in every detail she answered, deeply moved, and wrote among other things: "Yes, flies were his deadly enemies all his life."

During the war, I wrote on special occasions on the "Histogenesis and Classification of Ovarian Tumors" (*Monatschr. f. Geb. u. Gyn.* 49),

and on "Rare Cases of Ovarian Tumors" (*Arch. f. Gyn.* 149). My classification of the ovarian tumors was simple enough:

A. Blastoma cilio-epithelioma (germ cell blastoma); now I would call them surface epithelioblastoma: 1. Adenoides (solidum); 2. Cysticum; 3. Papillare; 4. Combinations of 1, 2, and 3; 5. Carcinomatosum; 6. Partim carcinomatosum (cystocarcinomatosum, adenocarcinomatosum, papillocarcinomatosum, etc.).

B. Blastoma epitheliale pseudomucinosum (mucinous epithelioma-terato-blastoma entodermale): 1. Adenoides; 2. Cysticum; Pseudopapillare; 4. Combinations of 1, 2, and 3; 5. Carcinomatosum; 6. Partim carcinomatosum in combination with 1, 2, and 3.

C. Combined tumors: 1. Adenofibroma and fibroadenomata with and without papillae, blastoma cilioepitheliale fibromatosum; 2. Combinations with sarcoma; 3. Blastoma cilioepitheliale and pseudomucinosum combination; I put granulosa tumors and the tubular adenoma and carcinoma in this group. This work was done in Brussels and dedicated to Carl Ruge on the occasion of his seventieth birthday.

The other work done in Brussels during the war was dedicated to Bumm on his birthday and treated granulosa cell tumor, then still called a rare type of ovarian tumor. This is the first remarkable description after von Kahlden-Mengershausen's work; it contains wonderful pictures of many kinds of granulosa cell tumor, the solid form, the folliculoid form, the so-called cylindromatous form, the variations of the trabecular form, the cystic form, and the granulosa surrounded by a clear theca interna. Of a second type of ovarian tumor, which I later called disgerminoma, I described four cases and depicted them as epithelial cells which lie in a very loose stroma and have large nuclei which fill nearly the whole cell body. Characteristic is the infiltration by lymphocytes. The only change in the uniformity of the tumor structure is the more or less intensive participation of the stroma. This tumor I related histogenetically to very early stages of sex cells, which have lost their special qualities for differentiation and ripening. A special ovarian tumor occurred in a child ten years of age. This tumor, structurally, was extraordinary, which I ascribed to the age of the girl. All tumors in early childhood have their own structure and differ from those of the adults.

When peace suddenly came the whole German government had disappeared from Belgium and the government of Brussels also. There were in our hospital more than three thousand patients, most of them

suffering from influenza and pneumonia. We had to collect the non-transportable cases into one hospital and to send the others by cars to Germany. We had many difficulties because from the 9th until the 16th of November, 1918, the socialist party governed in Brussels. Never have I seen so many incapable men nor so many criminals as I saw at that time. They had stolen our coal and the cars which I had collected for our patients for their private use. That was the least. After having provided for the last of our patients and having emptied our hospital, the 12 to 15 doctors and about 200 orderlies, most of them socialist, left the hospital at 10 o'clock in the morning on the 16th of November to walk to Germany. The retreat of the troops from Belgium and France was an impressive performance. Everything was arranged, the movement of the troops by all available means of transport, the victualing, the lodging, and so forth, so that we arrived in Germany after 5 days without essential disturbances apart from fresh snow which forced us to sleep in a church on the stony floor instead of in bivouac. Finally we arrived in Altona, disbanded, and soon we were at home, after four years and three months of war which had plunged us into debts beyond possibility of payment. At least I was home and my family was healthy. I found one room newly decorated. It had been burned out from the last Christmas tree. My first question, "Did you use the fire extinguisher?" met only blank faces. Nobody had thought of it although it had hung opposite the kitchen for years. Don't buy a fire extinguisher!

1919-1923

I shall not speak of the revolution in Germany which was guided by completely incapable men and carried out by the rabble. It was a sad time but did not stop me from going to my institution daily. On one occasion they were busy shooting all day between the railway stations called Anhalter Bahnhof and Potsdamer Bahnhof. I had to pass the connecting street (the Budapester). I showed my identification card of the University to a sergeant, who at my request had them stop shooting from both sides by hoisting a white flag so that I could cross the street unmolested and be very proud to have interrupted the ridiculous revolution for a few minutes. My sergeant was prouder still to have rendered a service to science. The only visible change in the town was the sudden popularity of shady liquor shops and dance halls. Also some damage was done to the royal castle and other buildings.

After four and a half years of intermission, I had to catch up with the literature which I formerly had followed regularly but which I had had no time nor opportunity to read in Brussels. Lubarsch, who was the pathologist at the University in Berlin, meanwhile had asked me to write the chapter on "Pathological Anatomy of the Uterus," and to assign the other chapters of the female genitalia to whomever I wished. J. W. Miller had already earlier accepted from Henke the commission to write the "Pathology of the Ovaries," and would not cede it. At the same time, I had to write some chapters for Veit-Stoeckel's *Handbook of Gynecology,* Vol. VI, I. Both books appeared eleven years later.

In the German Pathological Society in 1919, I showed a teratoma in the umbilical cord, the size of a child's head, with tissues of all germ layers. Since then I have seen only one teratomatous tissue in a microscopical section cut through the margin of a placenta in connection with the amnion in which ectodermal cysts are known to exist. The tumor stood in no connection with the chorion and this was normal. It seems that the chorion is a highly specialized tissue, but the amnion, a product of the fetus, may in a few cases be capable of reproducing the three germ layers of the embryo.

In 1920, I gave a detailed description of the development of the plica inguinalis of the mesonephros, i.e., the ligamentum rotundum of the uterus (*Arch. f. Gyn.* 113). The ligament from the beginning is continuous between the two prominent end points at the uterus and at the inguinal region. It is not true, as Felix supposed, that the two points grow through the peritoneal cavity in a straight line, but the ligament makes a detour with dorsal concavity by the thickening of the wall in an arch-like direction. Later this concavity is straightened out at the same time as the bladder emerges out of the interior wall into the peritoneal cavity, and the rectum, lying at first between the two horns of the uterus, is retracted into the posterior part. Then the whole peritoneal cavity gets larger in the sagittal direction and smaller in the transverse direction and the ligament takes the direct course which is recognizable in a few pictures from embryos of 14 to 24 mm.

In 1921 I discussed cases of so-called squamous epithelial nodules in hyperplastic endometrium and also in carcinoma (*Zeitschr. f. Geb. u. Gyn.* 115), but these are not true squamous epithelium and do not grow discontinuously in glands but, as was to be pointed out later by myself in serial sections, are continuous; they also occur in polyps. In that year I

described also the papillomas of the uterus, especially the papilloma verrucosum of the portio, a rare occurrence (*Arch. f. Gyn.* 115).

In the article about epidermization in erosio, I showed the absurdity of the expression "pre-cancerous" which means that the author in question cannot recognize whether a lesion is carcinoma or not. In 1920 I published an article concerning ovulation and the related normal and pathological changes in the uterus, dealing with Grosser's conclusions as to the effect of early pregnancies on normal ovulation and Halban's corpus luteum persistens. Neither is likely to change the doctrine of normal ovulation, of which the exact details, especially those of the regression, are repeatedly given. At the same time appeared (*Zentralbl. f. Gyn.* 1920) an article warning against the "interstitial gland" in the ovary, which exists only in theory.

I wrote about syphilis of the uterus and placenta in 1922. I demonstrated a primary effect at the portio five weeks before the appearance of secondary symptoms and a case in which the uterus was removed immediately after delivery without microscopical diagnosis because it was, to the experienced gynecologist, quite clear that it must be a carcinoma. Twice I had the opportunity to make the diagnosis of syphilis of the portio in a pregnant uterus. In both cases the diagnosis of carcinoma seemed incontestable to the clinician, so a histological examination was not made. Among other specimens I demonstrated also an ovulum 1 x 1 x 2 cm. which showed a hematoma partially in the decidua and partially in the ovum. Especially striking in this case was the thickening of the vessel walls in the decidua. Both parents had syphilis. The gynecologist in Germany very seldom diagnoses syphilis of the uterus (*Zeitschr. f. Geb. u. Gyn.* 84); in France, on the contrary, the diagnosis is made much too often.

In 1923 I demonstrated four cases of hidradenoma vulvae, which is usually absolutely harmless. One exceptional case is described by Eichenberg, a student of mine; it was clinically malignant and differed by tubular proliferation from other cases where the tumors remind us of the mammary intracystic papillomatous structure (*Zeitschr. f. Gyn.* 86). At the same time I showed four placental angiomas which were very different in size and with respect to participation of connective tissue and the caliber of the vessels. They are usually encapsulated, while in one case it was a diffuse angioblastoma similar to a rare case of Virchow. This rare case is described by a student of mine (Beaufays, *Arch. f. Gyn.*,

1937, 164). I recognized these angiomas as hamartoblastomata, in which the mesenchyme is not as important as the proliferation of the endothelium.

In 1919 I published a case of adenomyosis sarcomatosa, unknown before that. In definite adenomyosis of the uterus, its stroma grows deeper and through the whole uterine wall inside the lymphatics (*Zentralbl. f. Gyn.* 1919, 42). The same sarcoma of the stroma endometrii is described under a different name in the United States. Two articles were of more general interest; the first was an attempt to clear up the confused nomenclature of tumors and was published in the *Zentralblatt für Pathologie* in 1919. We learned from that, that our terminology of tumors is poor and the proposal was accepted for the classification of mixed tumors in (1) collision-tumors, which originate from accidental collision of two originally discrete or separate tumors; (2) combination tumors, in which the single essential parts have a common histogenesis, i.e., a common ancestor, the combination meaning a union with various possibilities; (3) composition-tumors, which are mixed tumors in which both the stroma and the parenchyma are blastomatous without being related histogenetically. The time is not yet ripe for generally acceptable propositions but the attempt has been made.

The second article was not written for people in general, for those who I think will be the majority of my readers. They may skip the next pages because I would not like to disturb anybody's faith. It may interest some thinkers among the readers to see how confused and slow some of our best pathologists are. I shall give only a short abstract of that article and add some remarks to make it a little clearer. The title of that article is "Causal and Teleological Perceptions in Pathology" (*Wiener klin. Wochen.* 1923, 4). I started with the works and conclusions of various prominent pathologists on the same topic which appeared incompatible with each other. The difference was explained by their various concepts of "biology." Ricker wrote a book on "Causal Pathology," in which he aimed to explain the pathological processes entirely on a physical basis in the sense of "natural sciences" in contradiction to "natural philosophy" (biology). The explanation and evaluation represent two contradictory views of the same thing. Hering believed that the question of utility and expediency may be good for the practitioner but not for "causal research." But in the material substratum of changes in cells during inflammation, he spoke of excitation and paralysis. The terms of

"regulation" and "reaction" should not be applied but only the bodily substratum of them, i.e., the change in the brain. One can blind oneself to the inevitable conception of utility and expediency (or suitableness) in biology but not in research. The merely mechanistic view cannot be called a tenable one. The relation between the single processes in the whole organism may be analyzed on the substratum in mechanistic thinking but relations, like "regulations," are not substrata but "abstractions," without which the connections in the organism are not understandable. To follow up these processes in a living organism is no less natural science and to connect them is unconditionally necessary. Every so-called causal consideration with its abstractions cannot be other than teleological. The mechanistic kind of thinking is not the only causal way of thinking. Conscious observation is not a simple perception but affords a comparison with other observations of a similar kind and demands in our system of thinking either equalization or sub-classification or super-classification. Comparison is surely not an activity of second rank, but forms the observation. I think one cannot make this more clear than the physicist Mach did with a few words: "The observation is already influenced by the theory." Merely mental circumstances do not happen but are accompanied by a physical substratum. Where there is no living body, there is no feeling, no will, no reason. The so-called soul is in reality an abstract word applied to denote the summary of these psychical qualities into an entity which should be the animating principle of individual life. The naive belief prevails that it is unimportant at which time the soul enters the body. For the scientist the psychical qualities are in no way different from those of the body prepared in the sex cells of our parents and ancestors and must be developed. The naive believer conceives of his psychical qualities only as of an entity, the soul, which should be the eternal witness to his vanity. I have not the intention to divert anybody from his belief, but I think one could be a little more careful of the abstract word "soul." I recommend replacing it by "character" or "personality," which is less compromising.

The word "psychic" or "mental" is reserved for those processes which are bound to the consciousness of which the moving force, the impulse or will, is only recognized when we particularly heed it. Flowing transitions between totally conscious to weak subconscious and fully unconscious processes occur at every second of our lives and one cannot demarcate them from one another. But one may call the latter psychoid

and recognize that the conscious and unconscious striving toward a goal are not deeply different. The memory, especially the unconscious memory or "Mneme" (Semon), is the basis of all vital functions, particularly in phylogenesis. "The more physical perception of vegetative life and the more psychic perception of animal life are subjective" (Mach). I would rather say they are "arbitrary." Considering the phylogeny of the organisms or of an organ, they can only arise and may continue to be capable of living by adaptation to the milieu. It is not thinkable that an eye phylogenetically is formed without light. It even becomes rudimentary when the animal gets accustomed to living in dark caves. Also, hearing, feeling, and other functions are influenced from without. In the primitive organism, the capability of reaction to light is present with formation of an eye as to structure and function. Generally speaking, one has no choice but to recognize as expedient in the sense of usefulness, all the reactions of a phylogenetical source of any organ. Self-preservation is a striving toward a goal. The substratum of this goal is impossible to describe. The merely mechanistic perception is a self-restriction of those who are in the error that they could keep away from any belief. The opinion that we can explain everything mechanistically is in itself already an unguarded assumption or belief. The basis or the background of any consideration is a belief or an axiom.

This is a summary of my point of view. He who can read German and is interested in these questions may read the original.

A short time ago I read the following sentence in *Science*: "Within the last few years it is mainly from the electronic physicists that we have obtained clues which will probably resolve the dilemma between crude causalism and teleology." If physicists of electronics could make this true, which I think is impossible, one might forgive them for the damage they have brought over mankind.

Inflation in Germany lasted from 1920 to 1923, especially from 1922 to 1923. During this time my children had to study. I can say in advance that we never experienced serious trouble but it was not easy to manage my finances. My salary was not very large and when it happened to be paid on a Saturday afternoon or when there was no newly printed money available at all, I sometimes lost millions. To give an example: I was at that time and for ten years to come, treasurer of the Berlin Gynecological Society and, as such, had at the end of 1923 a deficit of just 100,000,000,000 Marks. The next day the inflation was stopped by

the government who dictated that a million million should be one mark, which I paid boastfully out of my own pocket. I was glad that the time was over in which one could not discuss things other than the price of butter, ham, or the value of the dollar in relation to the mark. I was then nearly sixty years old and had to rebuild my estate. I was already prepared to ask fees for my diagnoses from colleagues who practised privately and had sent me their curettings for biopsy. Not one of them left me in the lurch but, on the contrary, after it became known to other colleagues, the number of referring physicians doubled and tripled in a short time so that from year to year I could save more and more.

In 1923, I had to give a lecture and a practical microscopical course in Oslo (Norway) and in Upsala (Sweden). I had prepared stained microscopical sections in thin paraffin on mica so that every student had the same object. I cut the series with scissors and imbedded them on glass slides in xylol and balsam. In Oslo I gave a lecture to the Medical Society concerning embryonal tissue anomalies and in Upsala I talked on cancer diagnosis. I have seldom had a better audience. In both countries the students have ideal opportunities to study seriously and they work intensively for eleven years.

In Sweden I lived in the house of the pathologist, Quensel, who later wrote the book on staining the carcinoma cells in centrifugat and on the effusion of the pleura and the peritoneum, which we applied with good success. His wife was a daughter of the famous Axel Key. She was a brilliant lady and an excellent housekeeper.

In Oslo, I resided with the assistants in the department of obstetrics under Professor Brandt, and it struck me that one did not once hear the women crying when in labor. To my question he replied—"Well, when I came here twenty years ago, they cried. I asked them, why must you cry, the animal does not cry, so you should be ashamed. In our small country that spread quickly and nobody cries any more." Brandt was an impressive personality and an artist with many interests, in painting especially. It was to his credit that he saved some pictures of the painter Munthe for his own country. There was a Professor Glaser in Berlin who, although known as a specialist in old German art, privately collected pictures of Munthe. When Munthe became a famous man, Glaser lent his pictures to the Museum of Arts under the special condition that his name should be mentioned as that of the owner and lender. In the beginning of the era of Hitler, Glaser went to Switzerland. To

the new directors in the Museum of Arts, the immeasurable value of the pictures of Munthe seemed to be unknown, since they asked Glaser to eliminate them from the contract and returned the pictures to him in Switzerland.

(*To be concluded*)

Notes and Queries

Edited by RALPH H. MAJOR

Devices to Prevent Premature Burial

PREMATURE burial was once a hazard so gruesome that in the past men have studied means to free the victim accidentally buried alive. Conviction of this possibility and dread of its eventuality were sufficiently serious to justify application for patents on devices designed to permit the person entombed alive to escape either by his own efforts or by signals to watchers awaiting such evidence of life. Printed descriptions of twenty-two such United States patents were presented to the Howard Dittrick Museum of Historical Medicine by Dr. F. C. Waite. These have provided material for this study.

In this series the inventors registered from France, Germany, Holland, Russia; New York, New Jersey, Ohio, Illinois, Indiana, Missouri, Iowa, Montana and California. The patents include electric contrivances for giving signals, tubes for supplying fresh air to the victims, and methods of summoning help or permitting escape. No device affords a guarantee that help will arrive in time, or that a watcher will remain on the alert. The person thus confined has no sure means of escape by his own enfeebled efforts, in the brief period before the spark of life is extinguished.

Patents, enumerated in chronological order, are as follows:

IMPROVED BURIAL CASE

No. 81,437 Franz Vester, Newark, New Jersey August 25, 1868 (Fig. 1)

"The nature of this invention consists in placing on the lid of the coffin, and directly over the face of the body laid therein, a square tube, which extends from the coffin up through and over the surface of the grave, said tube containing a ladder and a cord, one end of said cord being placed in the hand of the person laid in the coffin, and the other being attached to a bell on the top of the square tube, so that, should a person be interred ere life is extinct, he can, on recovery to consciousness, ascend from the grave and the coffin by the ladder; or, if not able to ascend by said ladder, ring the bell, thereby giving an alarm, and thus save himself from premature burial and death; and, if on inspection, life is extinct, the tube is withdrawn, the sliding door closed, and the tube used for a similar purpose."

This is the earliest of the series and probably the most efficient, for a mere tug on a rope sounds an alarm, hence a method of escape is provided.

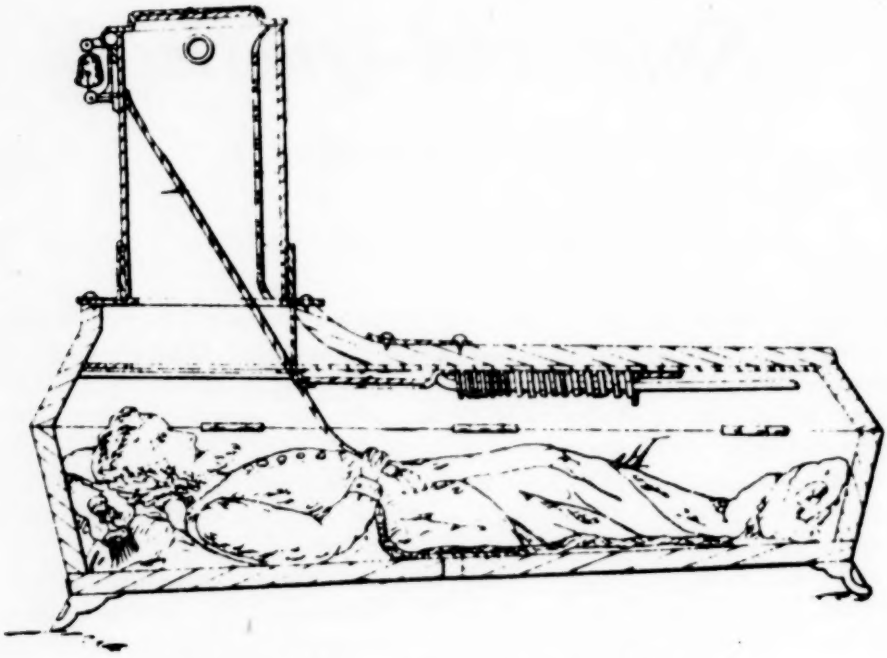

Fig. 1. Burial case with square tube attached to lid and extending above grave. The ladder is fixed to right side, cord and bell to the left.

LIFE DETECTOR

Dr. Theodore A. Schroeder and Hermann Wuest, Hoboken, New Jersey
No. 121,666 December 5, 1871

A tube leads down to the coffin, the lid of which opens by gravity when a catch is released. This can be accomplished with a minimum of effort on the part of the buried person. Through the tube fresh air is admitted. By means of a battery a circuit is established and an audible signal is produced above the grave. Slight movement of the body is supposed to complete a circuit, but from the drawings it does not appear that a contact would always occur.

GRAVE ALARM

No. 260,379 Albert Fearnaught, Indianapolis, Indiana July 4, 1882 (Fig. 2)

By a feeble movement of the hand a pin in a spring is released, forcing a signal device out of a tube which extends from the coffin to above the

grave. The signal device, upon exit from the tube, spreads out in fan shape to attract attention.

The mechanism is simple and the principle reasonable.

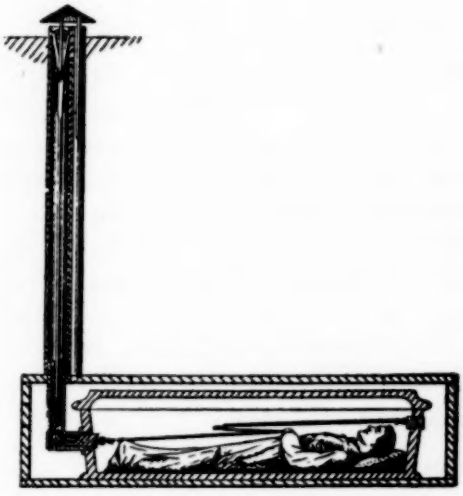

Fig. 2. Fan-shaped signal, at top of tube, is released by spring actuated by pull of cord in person's hand.

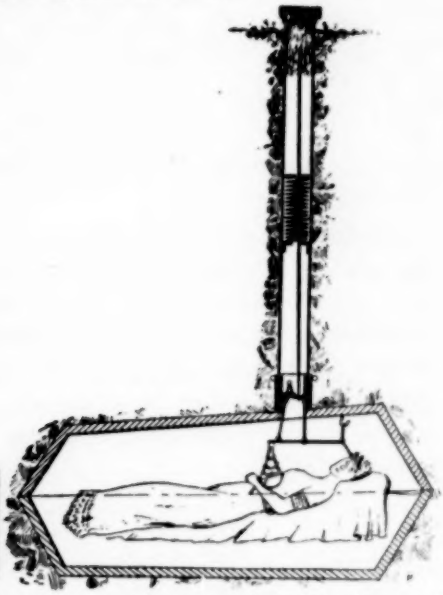

Fig. 3. Tufted signal is forced out of tube by a spring. Movement of hands or head disturbs the bridle rod and releases spring.

Device for Indicating Life in Buried Persons

No. 268,693 John G. Krichbaum, Youngstown, Ohio December 5, 1882

A pipe extends from above the grave to within the coffin. The lower extremity is T-shaped and rests on the body near the hands. Any movement of the hands turns the arms of the T and this effort shifts the cover outside the grave, permitting air to enter the coffin. The altered mechanism above ground is an indication of motion within the grave.

Intelligent cooperation of the victim is required to turn the arms of the T, otherwise the mechanism will not function.

Burial Casket

Charles Sieber and Frederick H. Borntraeger, Waterloo, Illinois

No. 329,495 November 3, 1885

A fan for forcing air into the casket is connected with the coffin by means of a pipe. A cord attached to the hand releases a trigger, setting in motion clock work and rotation of the fan. The front of the coffin is provided with a second tube and also a lamp and reflector at its lower end. This permits

inspection of the illuminated face of the buried one. A section of this second tube contains a mechanism operated by movement of the hands which releases upward a rod to which a signal may be attached.

The patent has several helpful features, but each additional one makes the mechanism more complicated. Each adds to the chance of failure.

COFFIN SIGNAL

Adalbert Kwiatkowski, Posen-Wilda, Prussia, Germany

No. 500,013 June 20, 1893 (Fig. 3)

In a coffin a tube extends from a bridle resting on the person's forehead, one end of the bridle being attached to the forehead and the other to the hands. The slightest movement of the body will also move the bridle and release certain rods. These rods release a spring in the tube connected with the outside, designed to project upward another rod with a signal tuft as well as to afford entrance of air.

All the requirements for detection are provided, assuming that a watchman remains vigilant.

GRAVE ALARM

No. 500,072 August Lindquist, Chariton, Iowa June 20, 1893 (Fig. 4)

A tube extends a suitable distance above ground, the lower end opening into the coffin through several other tubes protected with flanges and other devices. A cord extends down the tube into the coffin so that if the person regains consciousness he can grasp the cord, the upper end of which is attached to a rockbar with a bell on the other end. Thus an alarm is sounded, while at the same time fresh air is admitted. The extensive area of cemeteries is not considered.

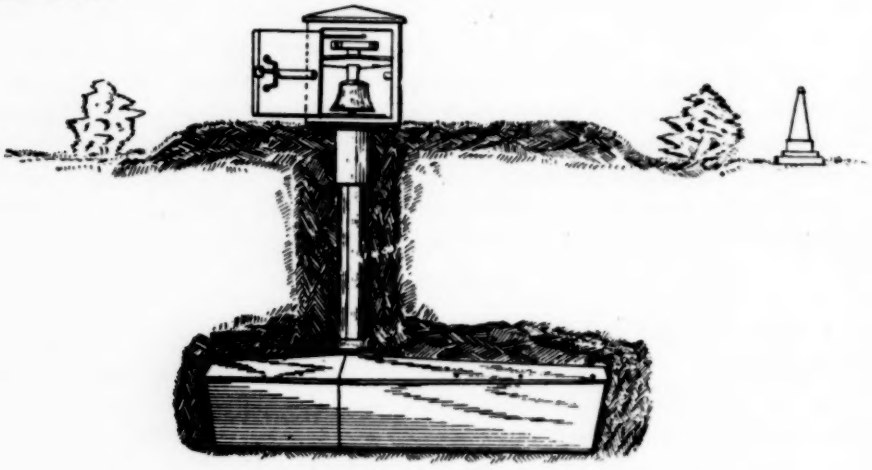

Fig. 4. Bell signal operated by rope extending into coffin.

GRAVE SIGNAL

No. 522,110 Hubert Deveau, New York, N. Y. June 26, 1894

This device is applied to the coffin and box with an operating mechanism which under ordinary circumstances keeps the coffin hermetically sealed, but when the victim struggles, air is admitted to the coffin, and at the same time a signal is displayed above ground. This is arranged by valves fitted about a pipe providing circulation of air. The signal is effected when the victim raises his head, which automatically alters the mechanism in a transparent chamber above ground.

The tube appears too small to deliver sufficient air to the victim. The signal is not a conspicuous one.

COFFIN

No. 572,118 Michael Karnicki, Warsaw, Russia December 1, 1896

Karnicki evidently had a keen interest in preventing burial alive, for he had obtained four patents to rescue a victim and had even taken the trouble to have the applications forwarded from Warsaw to Washington.

The first invention consists of a hermetically sealed box or coffin, a frame connected with the lid, a transparent plate to be secured to the frame, a mechanism for locking the frame and plate together, springs interposed between the frame and the plate and normally adapted to throw the plate from the frame, and a means of releasing the locking mechanism so that the springs can throw the plate from the frame.

"The sick person can thus raise himself, he receives air, and by striking on the glass tombstone or by operating an alarm device he is in a position to call the attention of passers-by to effect his rescue. If the awakening of the sick person takes place at night, it is inevitably necessary to wait for some hours, but, with the beginning of day, service at the church altar will afford a certain chance of speedy aid."

The victim's chances of rescue depend on his burial in a vault adjoining a church where services are held frequently. This patented coffin would not be operable if placed in a grave covered with earth.

APPARATUS FOR SAVING PEOPLE BURIED ALIVE

No. 572,119 Michael Karnicki, Warsaw, Russia December 1, 1896

This is Karnicki's second patent. A pipe leads from the coffin lid to the surface of the grave. A box encloses the upper end of the pipe, and a rod traverses the pipe and extends into the box and into the coffin, a spring maintaining the rod in a state of equilibrium. A projection is formed at the box end of the rod with a sliding, spring-controlled catch arranged inside the box where it is held in locking position by the projection on the rod. The catch holds a lid down upon the box under spring tension. A flag or other visual signal is secured to the lid, and an audible signal is operated by the spring catch when the lid is released from the box. An air tube also connects the coffin with the box. The rod traversing the tube is adapted to open the box.

Sealing flap or valve is located near the lower end of the tube and is held open and under tension by the spring in the rod. This valve closes the tube upon the withdrawal of the rod.

COFFIN

No. 576,676 Michael Karnicki, Warsaw, Russia February 9, 1897

Karnicki invented this third patent, a coffin with a locking and releasing mechanism for the lid. The lid is secured by a bolt having a sliding release which permits the doors or panels to spring upward. On slight pressure or pull by the awakened person both doors will at once spring up by action of flat springs. If the coffin is placed in a vault, the occupant, if sufficiently aroused, can rise, throw back the doors, and leave the coffin.

Light or a previous knowledge of existence of the bolt is assumed in order to set release in motion. This appliance is applicable to church burial, now largely abandoned.

APPARATUS FOR SAVING PERSONS BURIED ALIVE

No. 584,876 Michael Karnicki, Warsaw, Russia June 22, 1897

Karnicki's fourth invention provides an ingenious method of admitting air and illuminating the interior of the coffin either by a lamp or by daylight. A mirror or similar object is placed in the coffin in such a way that the awakened person can reflect light into the coffin. By means of a series of springs, movement of a slide causes a bell or gong to give an audible signal. The attendant is enabled to place a lamp in the pipe communicating with the interior of the coffin.

In this invention Karnicki has seemed to provide for all emergencies except a diligent attendant.

COFFIN

Marie C. H. Nicolle, Cesny-Bois-Halbout, France

No. 638,365 December 5, 1899

This is another type of safety coffin. It is built with a fragile pane of glass in the panel at the head and with a counterweight to break the glass for the entrance of air. An alarm signal can be attached outside the glass. The mechanism is set in motion by the person raising his head.

This invention is of use only before the coffin is covered in the grave.

PREVENTION OF PREMATURE BURIAL

No. 658,247 Christian A. Dietrichs, New York, New York September 18, 1900

The coffin is wheeled into an air-tight box with observation panels in the top of each. Pipes and tubes are arranged for supply and exhaust so that the contained air can be continuously renewed. An electric circuit is installed which provides an alarm signal should signs of restoration appear. By utilizing this special burial case no corpse is buried until absolute signs of death have been established; all obnoxious and infectious gases are drawn off and burned. This inventor also claims that this more rational form of burial service in the observation chamber is preferable to direct burial in a grave.

This would be especially advisable in inclement weather for the benefit of the mourners.

Safety Coffin

No. 898,021 Johan J. Toolen, The Hague, Netherlands September 8, 1908

In most improvements offered for coffin construction no provision is made for escape in an emergency. However, by this invention, the coffin opens automatically. The coffin lid is so arranged that it can slide, and a strong spiral spring fitted on the lid at the foot of the coffin constantly tends to push the lid aside. Two movable levers are fitted under the coffin lid close to the person's hands. Attention is directed to these levers by incandescent bulbs operated by a battery and placed near the hands. Slight displacement of the levers frees the bolt, closing the coffin, and allows the spring to open the lid.

Toolen's theories appear plausible, but even with the aid of lights near the levers, would it be possible for the occupant to raise his head high enough to see them?

This safety coffin might be useful in burials above ground, which are now infrequent.

Grave Attachment

No. 901,407 George H. Willems, Roanoke, Illinois October 20, 1908 (Fig. 5)

This inventor presents a preventive measure against live burial by observation of the corpse after it has been placed in the grave. At the foot of the casket an upstanding pipe is screwed into a flange on the cover; beneath it is a mirror capable of being adjusted, and an incandescent bulb suitable for illumination of the interior. Another mirror is attached at the upper end of the pipe and by adjusting both mirrors the buried person can be observed. Fresh air is also available through the pipe.

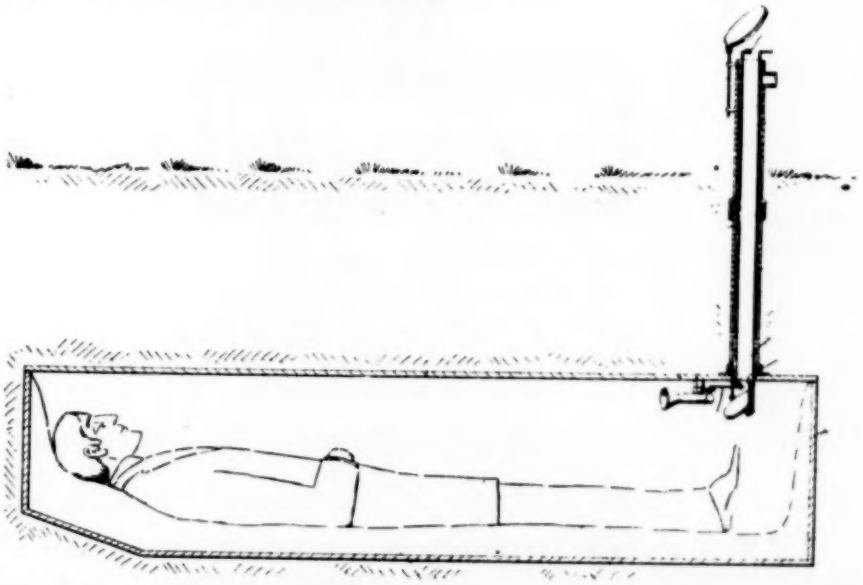

Fig. 5. Mirror at top and one at bottom of tube, and light within the case, allow inspection of corpse.

SIGNALLING DEVICE FOR GRAVES

Carl R. Zimmermann and Victor G. Gustafson, Joliet, Illinois

No. 925,260 June 15, 1909 (Fig. 6)

An elaborate mechanism is described by means of which, upon any revivification or disturbance of a recently buried body, fresh air enters the grave and an alarm is sounded, not only in the immediate neighborhood, but also at a central station some distance away.

A standpipe or conduit is screwed into the lid of the casket and provided with a telescopic member which acts as a ventilator. A hood protects the tube in bad weather. By means of an electromagnet and complicated wiring any appreciable movement of the hands of the person establishes a circuit permitting the ventilator to be fully opened and also sounding an alarm. A distinctive feature of this patent is the remote signal. The wiring is arranged so that changes in the circuit are registered at a distant station. This obviates the hazards of wide areas obscuring visible or audible signals.

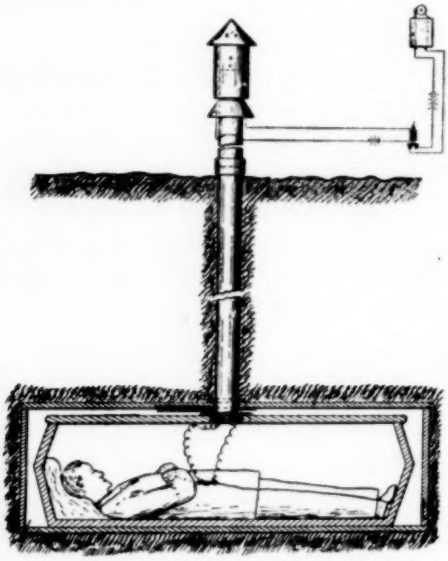

Fig. 6. Movement of wiring over hands and abdomen alters appearance of ventilator at top of tube. In right upper corner, a battery is used to relay circuit changes to distant station.

APPARATUS FOR PREVENTING HUMAN BEINGS FROM BEING BURIED ALIVE

No. 945,007 Anthony de Choinski, Dresden, Germany December 28, 1909

The object of the invention is to determine whether or not there is life in an apparently dead body. The plan proposed is to place the body in an open

coffin deposited in a special receptacle which is fitted with a door at the head for admitting the coffin. At the foot there is a pump for exhausting the air, and on top of the receptacle are a glass window for observing the body, a valve for admitting air, and a barometer for measuring the pressure of the interior. Fresh air is introduced into the closed receptable through the air valve. One quarter of the atmospheric pressure therein is then exhausted. According to the inventor this "relieves the external air pressure on the body and the inward pressure in the body, thereby increasing, will cause the body to give some sign of life, if any remains in it. If not, then it is the best evidence that no life remains."

This method does not produce a severe anoxia, but even if it did the premise that anoxia will cause an unconscious person to rouse is untrue. Instead of pumping out oxygen, a more rational procedure would be to pump into the body carbon dioxide which would stimulate respiration.

Alarm for Indicating Life in Buried Persons

No. 956,268 Albert M. Bartholemew, Stockton, California April 26, 1910 (Fig. 7)

This device is intended merely to sound an alarm in case a buried person should exhibit signs of life. A rod is attached to one end of a casket and it extends through a pipe above the level of the grave. Through this rod one end of the casket can be elevated. Furthermore, any movement within the casket releases a latch and an arm on the shaft of an actuating spring. This spring is connected through clockwork with an alarm or gong which is sounded intermittently. The sounding of the alarm is evidently the sole purpose of the mechanism.

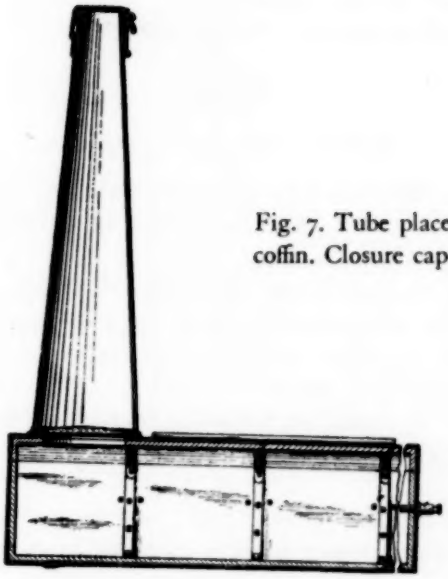

Fig. 7. Tube placed with sight glass in coffin. Closure cap protects top of tube.

LIFE DETECTING APPARATUS

No. 1,061,802 Peter J. Backus, Delphos, Ohio May 13, 1913

An apparatus has been devised to detect "surely and certainly" the presence of any life remaining in the body. The interior of the casket is equipped with an electric motor, vacuum pump, heater, light to illuminate the person's face, telephone transmitter connected with a receiver on the outside to receive any sounds originating within the casket, and terminals for making electric connections with the ankles and wrists. Through a glass window in the lid the effect on the body and the person's face of heat, anoxia, and electric stimulation may be observed, and by the telephone receiver sounds within the casket may be heard.

With the circulation static, no vasodilatation and no vasoconstriction of vessels; with negative results from anoxia; with electric stimulation of muscles present some time after death; and with so many possibilities of incorrect interpretation of transmitted sounds, this apparatus would be of little use except for observing the face.

ATTACHMENT FOR CASKETS

No. 1,436,757 Jacob Fishman, St. Louis, Missouri November 28, 1922

The attachment consists of a simple, inexpensive and durable cylindrical tube fastened to the coffin and extending above the ground, by means of which relatives and friends may view the deceased after interment. The tube is furnished with a flashlight and battery.

This method of direct observation is a very reliable one for detecting the presence of life, but unless observation is constant it would only afford reassurance when burial had not been premature.

COFFIN

No. 1,542,725 Alfred C. Ray, Butte, Montana June 16, 1925

A coffin is described which is claimed to preserve the body more or less indefinitely. It is built with a metal jacket and lid, and is sealed airtight. The air may be exhausted if so desired.

To ensure against accident the lid is provided with a sight glass and a sight tube, extending above ground, for viewing the body. This is of simple construction, conical in shape, and about six inches in diameter at the top. Light can be directed down toward the body.

Constant attention would be necessary to avoid missing any momentary sign of returning life.

In practically all burial devices and patented coffins described, success depends upon the cooperation of faithful watchers. In earlier days this coopera-

tion would have provided additional assurance to friends of deceased persons that the bodies would not be molested by resurrectionists or other similar enthusiasts in anatomical research.

In the mechanical contrivances described in these patents the bodies are hermetically sealed within the coffin to prevent the escape of noxious gases and the entrance of earth and moisture. When a tube extends above the grave provision is made for its subsequent removal without nullifying the seal of the coffin. In no case did the applicant for a patent furnish a model, but careful, clear, and sometimes elaborate drawings have been executed.

A wide variety of patents to prevent premature burial have been described. These include devices for observation of the occupant, for introduction of fresh air, for notification of friends of revival of the entombed one, and for provision of a means of escape. Many mechanisms are so complicated that failure is a strong possibility. Patented signals would be of little use in large cemeteries, with much landscaping, uneven terrain, and only occasional patrol. The patented coffins would be helpful only in vault burial, an infrequent method today. Most of the tests enumerated from detecting signs of life are of little or no value. Perhaps the oldest patent here recorded would prove most successful in avoiding premature burial. It provides a warning signal and a means of escape. The necessity for all these precautions has passed with the enactment of regulations by the state governing the burial of a deceased person.

Editorial Department, Cleveland Clinic HOWARD DITTRICK

Book Reviews

John F. Fulton, *Harvey Cushing. A Biography.* Springfield, Illinois: Charles C Thomas, 1946. xii+754 pp., illustrated, $5.00.

HARVEY CUSHING, who died in 1939 at the age of seventy, was a representative of that distinctive group of American doctors who succeeded in combining the old humanities and the new science in a most felicitous manner. Born in Cleveland in 1869, with three generations of physicians behind him, Cushing was educated at Yale College and Harvard Medical School. It was at the Johns Hopkins, however, under the influence of Halsted, Osler, and Welch that he achieved eminence as a surgeon. Here he emerged in his full stature as an outstanding doctor and scientist.

There was never any doubt that the story of Harvey Cushing's life would one day be recorded, indeed the subject himself expected as much; and there is likewise no doubt that the great surgeon has found a worthy biographer in Dr. Fulton, professor of physiology at Yale University. Dr. Fulton's book, an important contribution to medical biography, is worthy of occupying a place alongside Cushing's *Osler.* What Cushing did for William Osler, Fulton has done for Harvey Cushing, thus paying a high tribute to the literary achievement of his subject.

Dr. Fulton's task was rendered both easier and more difficult by Cushing's propensity to preserve carefully everything, every scrap of paper that went through his hands. This obsessive tendency provided rich and varied material upon which to base a biography, but the vastness of the available material must have made it very difficult for the biographer to select and to organize the data into a readable one-volume work. Cushing had kept (often in bound form) and catalogued letters, diaries, notes, clippings, and various other memorabilia—and to this Fulton has added statements from friends of Cushing that illuminate still further his brilliant career. The orderly, chronological fashion in which the author marshals his data clearly points to Cushing's achievements in neurosurgery, his literary and artistic gifts, and the many other facets of his busy and fruitful life.

The foundations of Cushing's medical and intellectual career were laid during his Baltimore period. It was at this time that he performed his first operations on brain tumors, started experimental work on the pituitary, and

cultivated his interest in medical history and bibliophily. Dr. Fulton, in an accurate and relatively non-technical manner, indicates the significance of Cushing's achievements, and does the same for his later period at Harvard and the Peter Bent Brigham Hospital.

The author has employed the chronological approach in an exceedingly skillful manner. By dealing with certain periods in the life of Dr. Cushing at length and in a more leisurely tempo, while others pass before the reader with what seems to be breathless speed, an impression of movement and development is created, and this adds greatly to the vitality of the book. Dr. Fulton also quotes extensively from Cushing's letters and diaries so that in some sections we have almost an autobiographical account. The text is illustrated with many photographs, but better still are the inimitable sketches by Cushing himself. Many of these sketches are from his travel diaries, and give striking evidence of his conspicuous artistic talent.

Cushing is treated with extreme objectivity by his biographer, so that the reader is permitted to assess for himself those personality characteristics that could fascinate or antagonize other persons.

In this enormously interesting and absorbing biography, Dr. Fulton has done more than illuminate the life of a distinguished American surgeon. He has made an important contribution to the history of medicine and culture in the United States. One may hope that Dr. Fulton will in time make available in published form the letters, diaries, and journals upon which this biography is based.

GEORGE ROSEN

R. Scott Stevenson. *Morell Mackenzie. The Story of a Victorian Tragedy*. New York: Henry Schuman, 1947. viii + 194 pp., illustrated. $5.00.

ON JUNE 15, 1888, Emperor Frederick III of Germany died, after having reigned for ninety-nine days. His death resulted from a cancer of the larynx. During his illness he had been attended by Morell Mackenzie, the famous British throat specialist. In consequence of his association with the Emperor, Mackenzie became involved in a polemic with a number of German doctors who had also attended the monarch at various times during his illness. As a result of this unedifying episode, during which there was a mutual bandying of charges of incompetence and a discreditable exhibition of political passion, posterity has not been kind to his memory, and the generally accepted accounts of the case of Frederick III have been prejudiced and unfair to Mackenzie.

Animated by a desire to ascertain the truth in this case, Scott Stevenson set about unravelling the tangled skein of history. In this aim he has succeeded admirably, for not only has he produced a well-balanced, absorbingly written

biography of Mackenzie, but he has also achieved a clear, comprehensible picture of the complicated events of Frederick's illness. The greatest portion of the book is taken up with the story of Frederick, his illness, Mackenzie's part in the case, and the aftermath of these events. Chapter Two, however, is devoted to Mackenzie's story before his involvement with his royal patient. Here the author paints an illuminating picture of the development of laryngology in Great Britain, and gives a vivid account of Harley Street practice in the 'seventies and 'eighties, during the golden age of Queen Victoria, when the doctors all wore "whiskers, tall hats, and frock coats."

Medical history and political history are inextricably united in the story of Morell Mackenzie and Frederick III, and Mr. Scott Stevenson gives a lucid and dramatic account of a significant episode in the history of nineteenth-century Europe.

GEORGE ROSEN

Florence Nightingale: *Notes on Nursing.* A facsimile of the first edition published in 1860 by D. Appleton and Co., New York, with a Foreword by Virginia M. Dunbar. New York: D. Appleton Company, 1946. xiv+140 pp. $2.00.

THIS FACSIMILE of the first American edition of one of the classics of medical literature is of more than historical interest, and this book still should attract readers far beyond the nursing profession. The story of Florence Nightingale is a familiar one. But the adventures of the Crimea were scarcely more than a stepping stone in her career—at least in her own eyes. She continued to work and to fight for more than half a century after the Crimean war and was able to realize many of her early dreams. Though living the secluded life of an invalid, what she then accomplished was of still greater and more enduring importance than her Crimean triumphs. She laid the foundation of the whole modern system of medical work in the army, and was recognized as the leading expert upon all the questions involved. By bringing her knowledge, her influence, and her activity into the service of the country at large, she became the founder of modern nursing and a leader of women. She raised the art of nursing in England from a menial employment to an honored vocation. This achievement was no fruit of her Crimean experience, although that experience enabled her to effect her purpose more readily than otherwise would have been possible. Miss Nightingale wrote well in a direct and intimate way, with common sense and acrimony, and her papers and pamphlets which covered all the subjects of her activity greatly extended her influence. Her *Notes on Nursing* is the most famous of her numerous writings. The book went through a long line of editions not only in England, her own

country, but also in the United States and, in various translations, on the European Continent. It was intended as a guide to "women who have personal charge of the health of others," and in her own words, as a manual for "sanitary nursing," but not for "nursing as a handicraft." Florence Nightingale knew that "the same laws of health or of nursing . . . obtain among the well as among the sick," and that the prevention of sickness is of equal importance and difficulty as the tending of the sick. Though some of the premises in the sanitary parts of her book may now seem to be out of date, the fundamentals of her teaching still remain as valid today as they were when her *Notes* were first published in 1859. The foreword by Virginia M. Dunbar supplies welcome background material on the history of the book and its importance. Perhaps it is written too exclusively from the viewpoint of the professional nurse.

New York City MARTHA ALEXANDER

William Henry McMenemey. *A History of the Worcester Royal Infirmary.* London: Press Alliances, Ltd., 1947. xvi+356 pp. 21/—

THIS STORY of one of England's voluntary hospitals offers the patient reader a fascinating picture of the evolution of medicine and public health since 1745.

Worcester, though a provincial hospital, was fortunate in securing for much of its 200 years of service (this volume celebrates its bi-centenary) able medical and lay leaders. Of the four original physicians, one, James Mackenzie, had studied at Aberdeen and at Leyden when Boerhaave was there; another, John Wall of Merton and Worcester College, Oxford, had also studied at St. Thomas's Hospital, and a third, Thomas Cameron, was very well thought of by the leading medical men of that day. All were scholars as well as physicians—Wall was also one of the founders of the porcelain works at Worcester, popularized the Malvern waters, was a painter, a writer and an experimentalist. For 31 years he continued as physician to the Infirmary. Descendants of these early physicians and other excellent physicians followed. In the nineteenth century the well-known Wilson Philip and Sir Charles Hastings guided the hospital for almost half a century. From the beginning good surgeons were on the staff and in later years came other specialists. The relatively high caliber of the medical staff appears in large part responsible for the success of the Infirmary; but at the same time the institution was often dominated and certainly survived only through the activities of its lay governors and friends. Bishop Isaac Maddox of Worcester, an energetic figure in the ecclesiastical world, is given credit for founding the Infirmary. Hospital records give abundant evidence of his great interest and that of the many townspeople, clergy, and aristocrats, (now and then even the "great" names such as Jenny Lind and Queen Victoria) who have supported the institution. But time after

time a card party and dance helped to raise the very few dollars needed to carry on. There were few large donors until the twentieth century, Lord Nuffield who gave £36,000 being one of the largest.

But the real story of interest here is the year-to-year picture of how a voluntary hospital of this kind grows with the times; grows through its continuing quarrels between medical staff and lay Board of Governors and despite its quarrels within the profession, particularly between physicians and surgeons; grows as it helps bring nursing to the status of a real profession; grows as it stretches out to help solve the health problems of the entire community.

Out of one of these latter episodes, a cholera epidemic, grew the forerunner of the British Medical Association. Under the brilliant leadership of Sir Charles Hastings, who though somewhat crippled and very quiet was apparently always able to rally all kinds of persons around a common cause, fifty physicians of the area were brought together in 1832 to form the Provincial Medical and Surgical Association. Its avowed main object was "the diffusion and increase of medical knowledge in every department of science and practice." Although there had been other medical societies in England none was ever, according to a contemporary medical commentator, "initiated with so avowedly fixed a determination to advance medical knowledge." Perhaps here lies the secret of its becoming the British Medical Association with Hastings as its first secretary.

In 1841 a sanitary survey was made of the city, followed in 1847 by another made by no less a figure than Edwin Chadwick. By 1861 William Strange, an early pioneer in the field of public health, was elected to the Infirmary staff and remained for 29 years. He collected information for the Health of Towns Commission, and nothing escaped his eye—nutrition, housing, filth, intemperance, disease, water supplies. Strange was a prolific writer and spoke on a wide variety of subjects, many of interest to public health workers.

Thus this story of a hospital, its problems and its staff takes the reader into many fields. In fact one can readily use the voluminous details which the author has recorded as source material for a variety of other studies on the public welfare. It is surprising, however, that he failed to include John Howard's uncomplimentary description of the hospital (*An Account of the Principal Lazarettos in Europe,* Warrington, 1789, p. 173).

The story of this voluntary effort closes as the hospital faces a new challenge, the new hospital services plan for England. In the pessimism with which one now connected with the hospital views this new development one sees the distrust of governmental services common to many workers in private agencies; but with the cooperation of the kind of persons who have been responsible for the development of the Worcester Royal Infirmary in the past 200

years the future seems assured even as the Infirmary becomes a part of a nation-wide hospital scheme.

New York City LEONA BAUMGARTNER

Walter Langdon-Brown. *Some Chapters in Cambridge Medical History.* Cambridge: Cambridge University Press, 1946. viii+119 pp. $1.75.

THIS LITTLE BOOK presents seven papers read before the History of Medicine Section of the Royal Society of Medicine by Sir Walter Langdon-Brown, Emeritus Regius Professor of Physic of Cambridge University. With one exception, the papers have been published previously in the *Proceedings* of the Society, but now for the first time they are brought together in one volume. In theme the essays treat of the great men of Cambridge University's medical tradition. Beginning with John Caius and continuing through the nineteenth century, Sir Walter describes the personalities of the Cambridge Medical School in a series of loosely connected biographies.

There is a wealth of antiquarian lore about Cambridge University in these essays. Many noteworthy sidelights appear. The picture of Queen Elizabeth's last days, as seen through the eyes of William Gilbert, her physician, is amusing, as is the note that, through the diligence of Cambridge resurrection men, Laurence Sterne returned to his alma mater as a subject for dissection a week after his death. It is interesting to learn that Alexander Selkirk, the original castaway, gave his papers to Daniel Defoe, thus assisting materially in the creation of Robinson Crusoe. At one time Cambridge simultaneously held "Bone" Clark, the anatomist, "Stone" Clark, the mineralogist, and "Tone" Clark, the musician. One odd individual's greatest contribution to the Cambridge Medical School is summarized as "throwing a spanner into the works whenever possible." In regard to the Regius Professorship, it is not surprising to find that in the seventeenth century it was a sinecure. The author is perhaps a little hard on Cambridge when he ascribes the slow development of its medical school before 1870 to internal factors alone, because medical education was equally retarded in most other universities at the time.

In this book the trends in Cambridge medicine unfortunately tend to be hidden by details of facts, dates, and positions held. Furthermore, the titles of the chapters are somewhat misleading. The major figures are swamped by descriptions of contemporary lesser lights, so that in the process of touching on *all* the individuals who may have contributed to Cambridge medicine, the author loses sight of the "great man" about whom his chapter was supposed to have been written. Thus the chapters on Heberden and Haviland contain very little about either, and in the chapter on the Triumvirate, one of the

three is omitted completely because he had been treated in another chapter! Better internal organization or a change in chapter headings would have avoided this difficulty. The chapters on William Gilbert and Sir Clifford Allbutt do not have these weaknesses and they are the most interesting in the book. In general, the essays are written with less objectivity than a historian would care to approve.

There are some small mistakes in the text. The discovery of the capillaries is attributed to Leeuwenhoek rather than to Malpighi (p. 33). John Wilkins of Wadham College, Oxford, is listed as "Williams" (p. 46). Several generalizations are open to question. To give a single example, the author's preface (p. vii) contains the following statement, partly repeated in the text:

> William Harvey applied physics to physiology, and it was the first of his disciples, Glisson, who established a biological approach to medicine, particularly in the co-ordination of clinical findings with morbid anatomy, a feature which has been characteristic of British medicine ever since, and particularly so during the first half of the nineteenth century.

Why choose Francis Glisson over Théophile Bonet if one must have a seventeenth century predecessor to Giovanni Battista Morgagni? One suspects that the importance of Glisson's work on rickets has been overestimated by the author because he was the only Cambridge medical professor of that time to make any contribution to the "new philosophy." Furthermore, the view that the coordination of clinical observations and post-mortem findings had been a characteristic of British medicine from the day of Glisson would be disputed by many. The seventeenth century was not yet sufficiently advanced in science to make this a general practice. The eighteenth century, as Garrison points out, was "essentially an age of theorists and system-makers" in medicine. In the latter part of that century, progress towards an objective science was renewed and pathology received new advancement at the hands of Morgagni, an Italian. The work of Morgagni was taken up by French medical men and improved methods of correlating clinical and pathological observations reached England from France in the period 1810-1820, as is evidenced by the translation of Bayle and other French works at that time. Then and only then did this type of work become a feature of British medicine.

Sir Walter apparently had access to much primary source material which is not listed in the bibliography at the end of the book. It is unfortunate that there are no specific references to lead others to the same data. An index of names would have given the book value as a reference work, for, in many instances, the author has assembled information which is very difficult for the average person to find. In conclusion, the papers on William Gilbert and Sir Clifford Allbutt are recommended for general reading and the others as reference biography for Cambridge medical men.

Cornell University PHYLLIS ALLEN

J. Trueta. *The Spirit of Catalonia.* London and New York: Oxford University Press, 1946. 198 pp.

NOT MANY PEOPLE in the United States are aware of the debt that European civilization owes to Catalonia. For this reason we welcome with pleasure this small book in which some of this information has been collected and presented in an interesting manner by Dr. Trueta, the famous Catalan surgeon, who is well known for his contributions to military medicine during the Civil War in Spain, and who after leaving his country worked in England during World War II.

Dr. Trueta deals with the origins of the Catalan people, follows the political evolution of Catalonia to the present day, and analyzes in some detail the scientific and cultural contributions of several famous Catalans. It is in this connection that the reader interested in the history of medicine will find chapters 4, 6, and 7 most attractive, for here the author deals at considerable length with Ramon Lull, Arnald de Villanova, Joan Lluís Vives, and Miguel Servet.

Various other topics of interest to students of the history of medicine and science are referred to in passing. Among these are the founding of the medical schools at Montpellier and Lleida (Lerida), Catalan seamanship, the contributions of Catalonia to cartography and navigation, and the Catalan achievements in commercial enterprise.

This book is recommended to the reader for its presentation of an overlooked aspect of European history which has a definite bearing on the history of medicine.

GEORGE ROSEN

John R. Baker. *The Discovery of the Uses of Colouring Agents in Biological Micro-technique.* London: Williams and Norgate, 1945. 22 pp. (Monograph of Quekett Microscopical Club. Originally published in its *Journal,* Ser. 4, Vol. 1, No. 6, 1943.)

THE AUTHOR calls attention to the fact that dyeing is only one of several methods in which coloring is used in microscopy, although previous histories of the subject confine themselves wholly to dyes. The present writer discusses the early history of several kind of methods, some of which employ pigments and colored substances other than dyes. He considers the subject under six headings: non-vital dyeing; vital coloring of pre-existent structures; histochemical color tests; impregnation with opaque substances; coloring by phagocytosis; injection of colored substances.

The subject of *non-vital dyeing* has been most carefully studied by previous authors, and the writer accepts Lewis' conclusions that the first in this field

was Leeuwenhoek in 1714 (published in 1719), as the earlier use of saffron by Vieussens could hardly be called histological staining. No one followed Leeuwenhoek's method, and the procedure had to be rediscovered later, the credit for doing so going either to Reichel (1758) or Hill (1770).

The *injection of colored substances* was first employed by Ruysch about 1722, who injected human blood vessels with a wax-tallow mixture colored with cinnabar, and employed a microscope for studying the injected vessels.

The *vital coloring of pre-existent structures* may perhaps be said to have started with Trembley (1744) who fed *Hydra* on colored organisms and thus stained certain granules vitally. Certainly vital staining was employed by Brandt in 1878 who used Bismarck brown to color granules in living *Actinophrys.*

Von Gleichen in 1778 made use of *phagocytosis in coloring organisms,* feeding ciliates with carmine. The most historic paper on the subject, however, appeared 60 years later when Ehrenberg (1838) used a similar technique in quite extensive studies of protozoa and drew various conclusions (some of them incorrect) from his findings.

The writer further shows that *histochemical color tests* trace back to Lind (1807) who used the reaction of iron sulfate with tannin, although Raspail (1825) was the real founder of the subject, using iodine as a test for starch in botanical microtechnique.

Impregnation with opaque substances was introduced by Krause in 1844 when he used silver nitrate in the study of epidermis.

A bibliography of over 70 references is given; but the writer makes no claims to having covered the subject completely, feeling that further studies may bring to light other papers of historical importance.

Biological Stain Commission, Geneva, New York H. J. CONN

Schweizer Lexikon in sieben Bänden. Zurich: Encyclios-Verlag A. G., 1945. Vol. I, A-Briand. xi pp. +1640 col., illustrated. 46 Sw. Frs.

THE EVENTS that revolutionized the cultural life of Europe during and following the first World War with one stroke also rendered obsolete all the encyclopedias that had appeared until then. Many statements had become outdated or irrelevant, while, on the other hand, the completely changed situation, which influenced artistic creation, science, political structure, economic conditions, boundaries, and many other elements, could not yet be taken into account.

It is therefore very understandable that the great publishing houses of Europe, which had been issuing such encyclopedias for decades, hastened as rapidly as possible during the 'twenties to bring these works up to date so

that they would be able to supply demands for information that was scientifically sound and in accord with the most recent events. We can name only a few of the more important encyclopedias: France published a new edition of the great *Larousse du XX^e siècle en six volumes,* England and America had the famous *Encyclopaedia Britannica,* while Italy created the magnificently produced *Enciclopedia Italiana* and the more popular *Grande enciclopedia popolare Sonzogno,* both glorifying "la cultura italiana dell'età fascista."

In German there appeared during the 'twenties a large number of revised or newly created encyclopedias, each of which presented social, artistic, and political facts in the light of its political standpoint. The Bibliographisches Institut in Leipzig published *Meyers Konversations-Lexikon* in 12 volumes with four supplementary volumes, which exhibited a strong right-wing tendency in political and cultural matters. On the other hand, the new edition of the *Grosse Brockhaus,* published by the Brockhausverlag, was more in accord with the modern tempo and took into account new *Weltanschauungen* and concepts of art. But as the last volumes of both the *Meyer* and the *Brockhaus* did not appear until the first years of the Nazi regime, their contents had to be brought into line with the Nazi doctrines and falsification of facts. As far as possible the volumes that had already appeared were subjected to revision along Hitlerian lines. Nor was the *Grosse Herder,* published during 1931-1935 by the Catholic Herderverlag, more neutral in its view, for it could not completely escape the Nazi impact, and besides attempted to convey confessional ideas. The encyclopedia, *Das kluge Alphabet,* published in 1934 by the Propyläenverlag in 10 volumes, accepted completely the Nazi trend.

It is therefore extremely gratifying that after such a long period of obscurantism, and factual misrepresentation, and following a new wave of revolutionary events, the Zurich publishing firm Encyclios has published the first volume of a new *Schweizer Lexikon in sieben Bänden,* which is completely devoid of any political or ideological influences. A group of outstanding Swiss scholars has undertaken the tremendous task of creating a reference work in German which will take account of the very latest advances in science, as well as the events that have occurred during the last decade. The publisher announces that this work will be completed before the other European countries that have suffered so grievously from World War II will be in a position to publish revised editions of their standard encyclopedias. Each of the seven planned volumes will contain approximately 800 two-column pages, profusely illustrated with photographs and maps, some in color. A new volume will appear every five to six months, so that we may expect the completion of this work by the beginning of 1948.

New York City CURT PROSKAUER

Schweizer Lexikon in sieben Bänden, 1946. Vol. II, Brjansk-Erfüllung. xi pp. + 1688 col., illustrated. 23 Sw. Frs.

THE *Schweizer Lexikon,* which has not been too happily named, because the name may create an impression that it is an encyclopedia which deals chiefly with topics concerning Switzerland, nevertheless demonstrates in the content of the two volumes that have appeared so far that it is a universal encyclopedia in the true sense of the word.

Printed on the very best paper in easily readable type, it contains a large number of admirable illustrations in the text and as plates. Some of these are in color, others are reproduced in black and white; they supplement visually the excellent articles. It is unfortunate that the authors are not indicated.

Medicine and its allied fields are dealt with in as much detail as the scope of a seven-volume *general* encyclopedia will permit. A not inconsiderable space in the form of special articles, as well as in connection with the treatment of general cultural relations, is reserved for the history of medicine.

New York City CURT PROSKAUER

Opuscula selecta Neerlandicorum de arte medica, fasciculus sextus-decimus quem curatores miscellaneorum quae vocantur Nederlandsch Tijdschrift voor Geneeskunde collegerunt et ediderunt. Amstelodami: Sumptibus Societatis, 1942. xxxvii+217 pp., illustrated. *Fasciculus septimus-decimus.* Amstelodami: 1943. xxxi+359 pp., illustrated.

FORTY YEARS ago the *Nederlandsch Tijdschrift voor Geneeskunde* initiated the publication of a series of Dutch medical classics under the general title *Opuscula selecta Neerlandicorum de arte medica.* Each volume presents the selected work in the language in which it originally appeared, as well as in an English or German translation. The most recent volumes of the series to arrive in the United States are numbers XVI and XVII.

Volume XVI is entitled *Observationes cytologicae et histologicae* and contains five papers by P. Harting, J. Moleschott, and F. C. Donders. The papers are preceded by an exceedingly good introduction by F. M. G. de Feyfer. These contributions are of considerable interest because they represent studies deriving from the period immediately following the presentation of the cell theory by Schleiden and Schwann. In the case of two of these scientists, Donders and Moleschott, the republication of their papers calls attention to aspects of their work not generally known. Moleschott is probably most widely known for his materialistic philosophy, and Donders for his studies on the eye, but this volume leads to a more rounded picture of their work.

Volume XVII contains nine papers all dealing with the subject of cutting

for the stone. These range in time from 1526 (Desiderius Erasmus) to 1777 (Petrus Camper). The volume was edited by M. S. van Andel of Gorinchem, who died in 1941 before it was published.

It is particularly noteworthy that the publication of this series continued even under wartime conditions, when Holland was subjected by a brutal conqueror. The Netherlanders have always been conscious of their cultural heritage (see, for example, the posthumously published papers of Johan Huizinga, *Mein Weg zur Geschichte,* Basel, 1947) and this characteristic is equally evident in their appreciation of the classics of Dutch medicine.

On various occasions, Sigerist has called attention to the importance of making available (by reprinting or translating) and of studying the classics of medicine. I want to reiterate this point, and to suggest that the American Association of the History of Medicine undertake to study this matter and to see how best to stimulate interest in this type of work.

GEORGE ROSEN

Lychnos. Lärdomshistoriska Samfundets Arsbok (Annual of the Swedish History of Science Society), 1944-1945. Uppsala and Stockholm: Almqvist & Wiksells Boktryckeri, 1945. ix+511 pp., illustrated.

THE YEARBOOK of the Swedish History of Science Society for 1944-1945 contains a variety of interesting papers and reviews, and nobly upholds the standards set in the preceding volumes of this annual. Among the original papers are the following:

Erik Andreasen and O. C. Hollnagel-Jensen. Ludvig Jacobson's youth and his first communication on the organon vomero-nasale.

Ragnar Granit. Frithiof Holmgren and the discovery of the retinal electrical response.

Sten G. Lindberg. Zacharias Orthius, a sixteenth-century German humanist with Swedish connections.

Sten Lindroth. Adam Afzelius, a Linnean in England and Sierra Leone.

E. C. Millington. Studies in cohesion from Democritus to Laplace.

N. V. E. Nordenmark. Swedenborg and the longitude problem: an account of a newly discovered letter from Wargentin.

Johan Nordström. Magnus Huss's medical study tour in 1837-1838. Based on unpublished notes and letters. With an appendix: Notes on the history of physical diagnosis in Sweden before Magnus Huss.

Johan Nordström. Goths and Spaniards. On the history of Spanish Gothicism.

Henrik Sandblad. The Copernican system of the universe in Sweden. II. Cartesianism and the triumph of Copernicanism.

George Sarton. Portraits of ancient men of science.

There are also short notes by Arne Fredega, on the problem of Scheele's collaboration in the Swedish Pharmacopoea; Sten Lindroth, Sir Martin Beckman, a forgotten Anglo-Swede; N. V. E. Nordenmark, a pseudonymous work of Linné.

Of the greatest interest to the reviewer is Nordström's paper on Magnus Huss and the tour that he made in 1837-1838 of the medical centers in Germany, Austria, Switzerland, and France. Although he visited Berlin, Halle, Leipzig, Dresden, Prague, Vienna, Munich, Zürich, and Freiburg, the ultimate goal was Paris, where Huss spent the spring and summer of 1838. Here he worked chiefly with Andral and Bouillaud. In the autumn of 1838 Huss returned to Sweden, where he revitalized Swedish medicine and firmly implanted the methods of the Paris school.

In an appendix dealing with the history of physical diagnosis in Sweden before Magnus Huss, the author shows that several Swedish physicians had become acquainted with the new methods of diagnosis, auscultation and percussion, during the 1820's, and that Magnus Christian Retzius in 1823 and 1824 had studied stethoscopy with Laennec, who presented him with a stethoscope. A photograph of this stethoscope, which is in the instrument collection of the Surgical Clinic at Uppsala, is to be found on page 211 of this volume.

Noteworthy also is the circumstance that during Huss's student days at Uppsala, the medical faculty was still under the influence of German *Naturphilosophie*. It would be of interest to trace the extent to which Romantic Medicine influenced the medical thought of such countries as Holland, Denmark, Sweden, Switzerland. (At the same time, it may be worth mentioning that a thorough and accurate study of Romantic Medicine in English is sorely needed.)

From the brief presentation given above the reader will realize that this volume is rich in interesting studies. Perhaps it may incline some to learn Swedish, but for those who do not care to make the effort, the original articles have summaries in English or French. GEORGE ROSEN

R. J. FORBES. *Bibliographia Antiqua. Philosophia Naturalis. II. Metallurgie.* A. D. 1939 (nos. 613-4130) Leiden: Nederlandsch Institut voor het Nabije Oosten, 1942.

IDEM: III. *Bouwmaterialen,* A. D. 1939 (nos. 4131-4423) *IV. Aardewerk, Faience, Glas, Glazuur, Sierteenen,* A. D. 1939 (nos. 4424-4895). Leiden, 1944 (no pagination).

These bibliographies issued under the editorship of the well-known scholar R. J. Forbes will be of great value to students of ancient science and technology. Within each subject classification, the authors are arranged alphabetically.

The titles of the sections are given in Dutch, German, English, and French. While the sections reviewed here are not directly germane to medicine, we feel certain that those interested in medical history will find references of value. We look forward to the future installments of this bibliography.

GEORGE ROSEN

Conrad Türsts Iatro-mathematisches Gesundheitsbüchlein für den Berner Schultheissen Rudolf von Erlach. Mit Erläuterungen herausgegeben von Dr. med. Alfred Schmid. Bern: Verlag Paul Haupt 1947 [Berner Beiträge zur Geschichte der Medizin und der Naturwissenschaften, herausgegeben von Prof. Dr. E. Hintzsche und Prof. Dr. W. Rytz, Nr. 7], 80 pp.

CONRAD TÜRST, as we learn from the introduction, was born in Zürich around the middle of the fifteenth century. He received his M.D. degree in Pavia in 1482, was chosen town physician of Zürich in 1489, served the dukes of Milan as astrologer and political agent, became body physician of the Emperor Maximilian in 1499, and died in Zürich on August 18, 1503. In his astrological work he was probably influenced by another Swiss physician, Conrad Heingarter, whose name has become familiar through essays by H. E. Sigerist[1] and L. Thorndike.[2] Türst is said to have made the first modern geographical map of what was then the Swiss federation.

The present little work was written by Türst in 1482 for Johann Rudolf von Erlach, mayor of Bern, when Türst resided in that city shortly before and following his graduation in Pavia. It consists of two parts: first a dietary regimen for the mayor, the other a calendar for 1482 and subsequent years together with the astrological and medical comments on bloodletting, the signs of the zodiac, and the planets. From the medico-historical point of view, neither part shows any originality. The regimen is written around the regulation of the six "res non naturales," and the iatromathematical rules correspond to similar texts of the late middle ages. Nevertheless the editor of the texts, Dr. Alfred Schmid, has made a worth-while contribution not only by editing the text but, above all, by accompanying it with copious and detailed notes. These notes constitute a commentary which will be helpful for the understanding of similar texts. Unfortunately Dr. Schmid died before writing the introduction, but this task has been fulfilled most satisfactorily by Professor Hintzsche, one of the editors of the series.

The Johns Hopkins University Institute of the History of Medicine

O. TEMKIN

[1] Henry E. Sigerist, "Conrad Heingarter, de Zurich, et la médecine astrologique au XV^e^ siècle," *Comptes rendus du 2^e^ Congrès Internationale d'Histoire de la Médecine* (Paris 1921), Evreux, 1922, pp. 323-29.

[2] Lynn Thorndike, *A History of Magic and Experimental Science* (New York, 1934) IV. 357-85; Conrad Heingarter in Zurich manuscripts, especially his medical advice to the Duchess of Bourbon, *Bull. Hist. Med. 4* (1936) 81-87.

GEORGE ROSEN and BEATE CASPARI-ROSEN. *400 Years of a Doctor's Life.* New York: Henry Schuman, 1947. xvii+429 pp. $5.00.

THE PHYSICIAN, like many another man, has sometimes yielded to the autobiographical impulse and has sometimes persisted, whether through vanity or obstinacy, until his tale was completed and committed to paper. Of the number of medical autobiographies which have been published it would be difficult to form a just estimate. Doctors George Rosen and Beate Caspari-Rosen in their new and unusual anthology have excerpted eighty, most of which are little known to the ordinary reader. In medical autobiography, as in other fields, the prelusory studies of the older scholars daily recede toward obsolescence, and the theme renews itself for fresh investigation.

The new anthology is entitled *400 Years of a Doctor's Life*, the designation signifying that four centuries of autobiographical production have been canvassed. It is not the temporal scope or the method of selection which forms the chief distinguishing mark of the new volume; the distinction resides in a special principle of arrangement. The authors have undertaken to prepare what might be called a montage or composite picture of the doctor's life story. To this end they have assembled autobiographical excerpts which deal with ten phases or stages, e.g., early years, elementary schooling, medical schooling, medical practice, and so on through marriage, war, and contemplation of death.

Since an appreciation of the authors' purposes is essential to an equitable evaluation of their work, the following is quoted from their preface:

> Out of many ventures in medical autobiography made during the past four centuries there have been chosen those passages which are most revealing of the medical human being in the round—that convey something of the substance and marrow of what it means to be a doctor. The aim is to present an informal portrait which will show the doctor not only as the Great Healer or Great Scientist (though these aspects are not neglected) but also as a citizen of everyman's world. To achieve this aim, more than eighty personalities have been selected from among men and women who have made significant contributions to the literature of medical autobiography. What these doctors say here reveals to the layman the matrix of a doctor's life and a sense of the sweeping drama of medical history, with a clarity attainable in no other medium. . . . For the most part the selections have been taken from formal autobiographies, but the literary genre in which the doctor wrote is not of first importance to the scheme. Letters and some verses have received equal welcome. . . .
>
> Here, then, is a book by doctors about doctors. It is, of course, an anthology, but its arrangement is deliberate, shaped to its aim of presenting phases of medical life common to the great majority of doctors, to create at last a portrait of the Doctor. . . .

From the viewpoint of human interest the passages which compose the anthology represent a rich and rewarding selection. A prime example is Oliver Wendell Holmes' portrayal of his childhood fears and his reactions to the New England doctrine of infant damnation. Another is Daniel Drake's account of his early lessons in a log schoolhouse in Kentucky. Whereas Holmes'

retrospective comments show the influence of his medical humanitarianism, the excerpt by Drake bears no such specialized imprint and represents what almost any educated American of the same region and era might have written. Equally replete with human interest is Elizabeth Blackwell's description of her attack of ophthalmia, contracted during a course of study at an obstetrical clinic in Paris. Even more affecting is Bernard Naunyn's account of a consultation on a girl with advanced tuberculosis in a small Russian town. A non-medical reader might well consider this the most moving passage in the entire volume.

Those who look to autobiography for insight into the development of the human faculties and character will find much suggestive material in the present collection. Such readers will be attracted at once to the section in which the young Ramón y Cajal, incarcerated in a school "brig," independently discovered the principle of the camera obscura and earned thereby the chill indifference of his less observant classmates.

> . . . I was so simple as to tell my comrades in confinement of my discovery, and they, laughing at my foolishness, assured me that the phenomenon was of no importance, since it was a natural thing and, as it were, a trick which the light plays when it enters dark rooms. How many interesting facts fail to be converted into fertile discoveries because their first observers regard them as natural and ordinary things, unworthy of thought and analysis!

A somewhat later stage in the developmental cycle is portrayed in two selections which deal with Paul Ehrlich. The first of these evidently was taken from a autobiographical sketch; it shows Ehrlich as a seventeen-year-old student deeply absorbed in original ideas and largely indifferent to the curriculum. A complementary passage describes Ehrlich as he appeared to an observant and appreciative teacher, the anatomist Wilhelm von Waldeyer. Fully matured discoverers are depicted in the selections from von Baer, Ross, and Cannon.

The practice of medicine, as one might expect, is given a generous measure of attention. The excerpts in this part of the anthology are especially welcome to those who are interested in the social and political conditions which affect the practitioner. Thus Johann Dietz (1665-1738) exemplifies the barber surgeon, half a servant, the lackey of nabobs. Hufeland's sketch portrays the rigors of German country practice, and Nathan Smith's letters give brief glimpses of itinerant surgery in rural New England.

The gem of the section on medical practice is taken from the writings of Benjamin Rush. Rush found that in his efforts to develop a clientele he was hampered by two circumstances. First, he opposed the speculative doctrines of Cullen although these doctrines were highly regarded in Philadelphia at the time. Second, his advocacy of the American Revolution had earned for him the dislike of the wealthy Philadelphians, many of whom were Tories.

Such people asserted that Rush's "meddling with politics" had made him unacceptable as a physician.

Three aspects of the practitioner's life are illustrated by excerpts from the autobiography of J. Marion Sims. One vignette shows Sims as a twenty-two-year-old beginner in small-town practice; he had two fatal cases at the very start and felt obliged to withdraw his shingle. A second excerpt describes Sims' persistent effort to develop a cure for vesicovaginal fistula. The patients were negro slaves whom Sims maintained at his own expense for a long time. The incident illustrates in detail the difficulties encountered by a practitioner who attempts to engage in independent research. A third excerpt is a remarkably vivid description of an attack of malaria, the consequence of practising medicine in an area of high endemicity.

Considerations of space make it impossible for the reviewer to describe or even mention many of the interesting and valuable items with which the anthology is so amply provided. It is hoped that the details already adduced will give the reader an exact notion of the purposes, arrangement, and contents of the volume. It remains to consider whether the authors have achieved their purpose of creating a "portrait of the Doctor." In the opinion of the reviewer no generalized portrait has been produced and none is possible. What generalization could be relevant simultaneously for Paracelsus—a boor—, Marion Sims—a Southern gentleman—, Ronald Ross—a scientist—, Littré—a lexicographer—, and Schweitzer—a saint? Not all physicians have been animated by a love for the art or a love for the science or even by a love for the human race.

If this view is correct, it would be best not to take too seriously the frame of reference on which the anthologists have disposed their offerings. Instead, one should appreciate the fact that Doctors Rosen and Caspari-Rosen have done a useful service by assembling a generous number of valuable excerpts. These will edify the layman, inform and stimulate the student, and encourage the practitioner, scientist, and scholar. To all such persons the volume is recommended.

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NOTES ON CONTRIBUTORS

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J. JOAQUÍN IZQUIERDO, M.D., Professor of Physiology and head of the Department of Physiology of the Medical Faculty of the National University of Mexico, is the author of the following books: *Balance cuatricentenario de la fisiología en México,* 1934; *Harvey, iniciador del método experimental,* 1936; *Bernard, creador de la medicina científica,* 1942; and of articles on the history of science.

PEDRO LAÍN ENTRALGO, M.D., is Professor of the History of Medicine at the University of Madrid where he succeeded Professor Eduardo García del Real in the chair. His books include: *Medicina e historia* and *Estudios de historia de la medicina y antropología médica.*

ROBERT MEYER, M.D. (see Vol. 2, p. 597 of this *Journal*) died on 13 December 1947 in his 84th year.

GEORGE ROSEN, M.D., Ph.D., Editor of the *Journal,* has recently been appointed a member of the editorial board of the *American Journal of Public Health.* He is author (with Beate Caspari-Rosen, M.D.) of *400 Years of a Doctor's Life,* which has just appeared.

GEORGE URDANG, Ph.G., D.Sc.Nat., is a prominent historian of pharmacy and Director of the Institute of the History of Pharmacy at the University of Wisconsin in Madison.

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